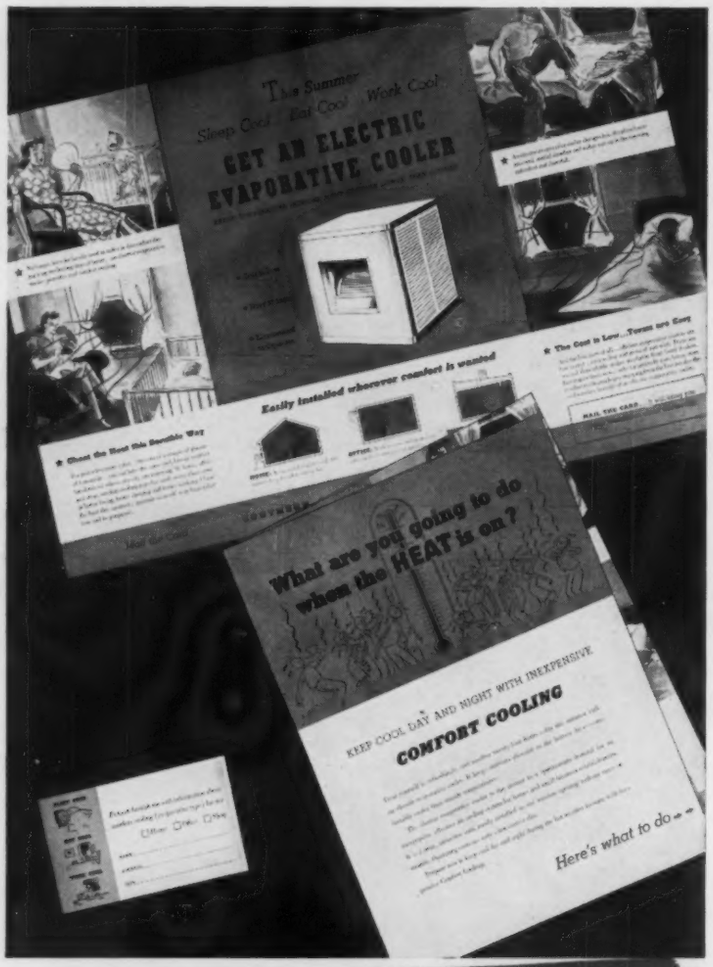
ELECTRICAL WEST

THE ALL-INDUSTRY MAGAZINE OF PROGRESS

...-HILL CO.
...IFORNIA

AUGUST, 1940

25c a Copy


This Summer
Sleep Cool · Eat Cool · Work Cool
GET AN ELECTRIC EVAPORATIVE COOLER
Easily installed wherever comfort is wanted
What are you going to do when the HEAT is on?
KEEP COOL DAY AND NIGHT WITH INEXPENSIVE
COMFORT COOLING
Here's what to do

NO... IT'S NOT A NEW KIND OF HAT... IT'S AN ICE BAG!
For Cool Working
GET AN ELECTRIC EVAPORATIVE COOLER
DON'T WAIT
AH!
SEE YOUR DEALER TODAY

SELLING SUMMER COMFORT THROUGH COMFORT COOLING

This year Edison advertising again extensively promotes "comfort cooling" for homes, offices and shops in selected districts in Edison territory. Newspaper and direct mail advertising are combined to obtain complete coverage of potential "comfort cooling" prospects.

SOUTHERN CALIFORNIA Edison

ELECTRICAL WEST (with which is consolidated The Journal of Electricity), August, 1940. Vol. 85, No. 2. Published monthly by the McGraw-Hill Company of California, 68 Post Street, San Francisco, Calif. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. Additional entry as second class matter at the post office at Los Angeles. Printed in U. S. A. Subscription rate in U. S. and U. S. possessions, and Canada, $2 per year; all other countries $3 gold (thirteen shillings). Single copy 25c.
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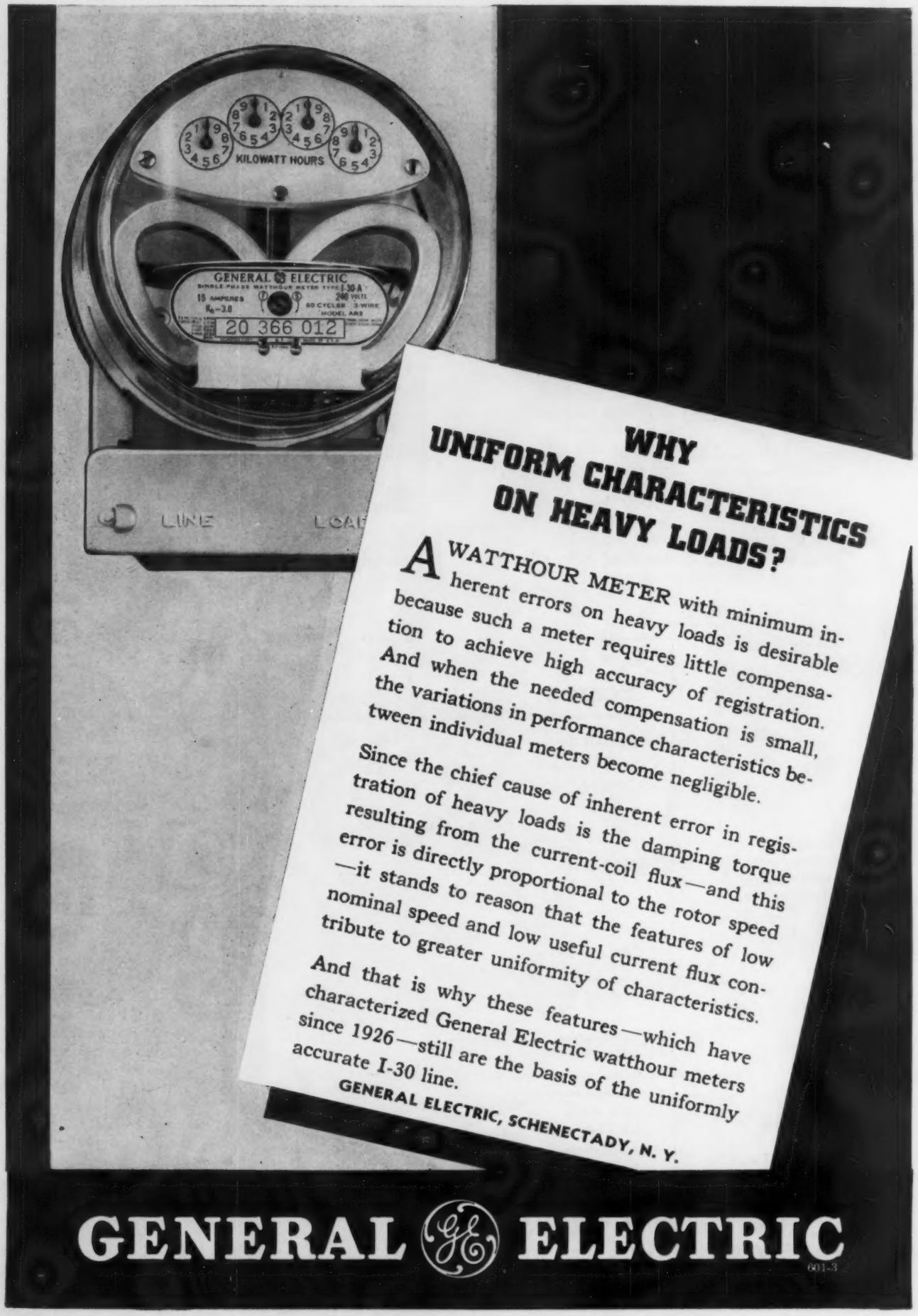


WHY
UNIFORM CHARACTERISTICS
ON HEAVY LOADS?

A WATTHOUR METER with minimum inherent errors on heavy loads is desirable because such a meter requires little compensation to achieve high accuracy of registration. And when the needed compensation is small, the variations in performance characteristics between individual meters become negligible.

Since the chief cause of inherent error in registration of heavy loads is the damping torque resulting from the current-coil flux—and this error is directly proportional to the rotor speed—it stands to reason that the features of low nominal speed and low useful current flux contribute to greater uniformity of characteristics.

And that is why these features—which have characterized General Electric watthour meters since 1926—still are the basis of the uniformly accurate I-30 line.

GENERAL ELECTRIC, SCHENECTADY, N. Y.

GENERAL ELECTRIC

601-3

Here in the WEST

People

E. B. Kipp

who in this issue begins a series of articles on relay fundamentals is well known in many sections of the West. As meter, relay and instrument specialist for Westinghouse, he travels regularly from his home office in Los Angeles, through the Phoenix, Salt Lake and Butte areas.

A graduate of Utah, he took the Westinghouse stu-

dent course beginning in 1926, went to Los Angeles in 1929. He did a two-year turn with the Salt River Assn., and with Central Arizona P&L, both at Phoenix, rejoined circle W in 1934.

His travels also resulted, two years ago, in his marrying a Butte girl. He is pro candid camera, and expert on color shots of Western nature subjects. Hobby two: the trumpet.

Fred Schoss

has the distinction of being the first Maytag dealer in the West. That was back in the early twenties. Later he became a distributor, but since 1929, he concentrated on a local dealership in Ogden, Utah where he has through the past decade built up a fine business.

He is a believer in good wages and fair commissions for salesmen under his wing, and has found in a compensation plan (which is fully outlined on p. 30-31) that it has paid dividends to he and his present partner.

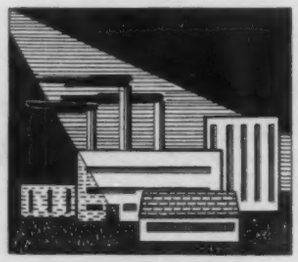
A staunch believer in sales meetings, Schoss gets together with his men every working day in the morning to discuss sales possibilities, trends and to impart to them much of the wisdom that he has accrued; but he's a good listener, too.

Yes, it's a pretty well known fact around Ogden, when salesmen trade talk, that Fred Schoss is a good boss.

Preview

Spotlight

Lighting in the West makes great strides in a year. Novel methods, significent installations, trends and



changes, will be pictorially presented to inaugurate the 1940-41 lighting season in the September issue. Commercial, industrial, street and domestic lighting will be reflected from western installations.

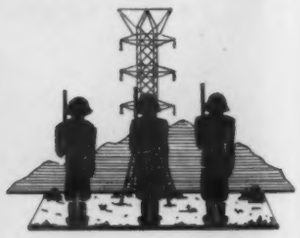
Washer-Ironer Week

National Washer and Ironer Week will come in October. To prepare salesmen and dealers with ideas to use most effectively during that month the September Sales Guide will be on home laundry equipment.

Saturation points have by no means been reached in this particular field. There'll be no better time than this to tie-in with national promotion.

System Protection

Breakers and relays are the equipments which will be given special attention in the engineering section of the October issue. Discussions



by and for engineering and operating men will be short and terse.

Protection discussions will include examples of recent installations in which special control and relaying problems were involved and will state the way in which these were met and solved.

Increasing interest in air breakers is the incentive for presenting a digest of recent developments and essential data on these units.

Relay men and others will also be interested in the second chapter of Mr. Kipp's series on relay fundamentals. (Chapter I appears in this issue, p. 45).

Pages

National Defense 29
Cooperation of electric power industry can and will be a major defense factor.

Compensation on the Schoss-Read Plan 30
A Salt Lake City firm has an excellent method of rewarding its alert salesmen.

Good Mayonnoise Calls for Electric Brooders 48
Laura Scudder poultry farm in southern California depends on electricity.

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Adequate wiring demands modern, standardized methods of home construction.

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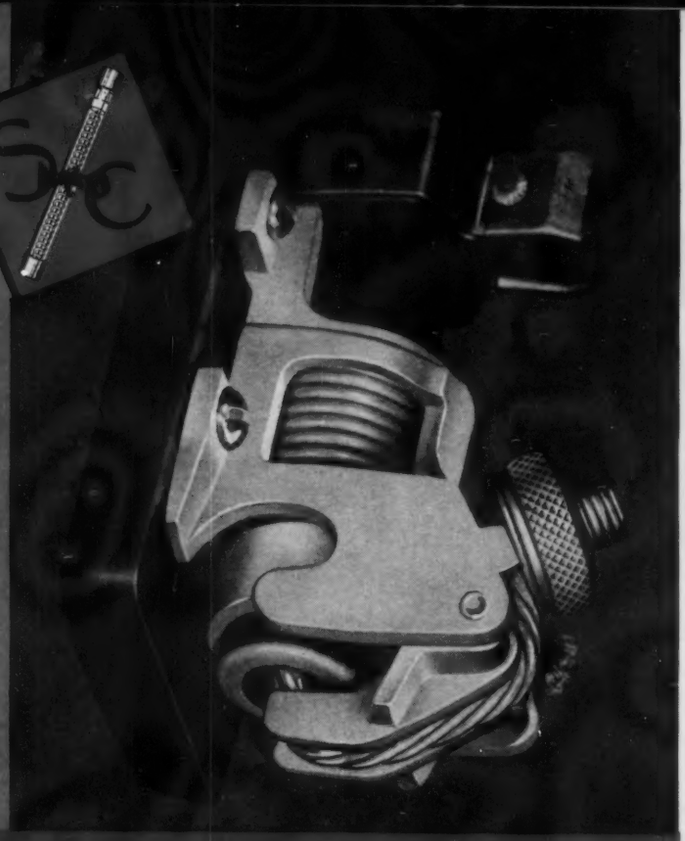
Cover: Inspectors' convention at Great Falls, Mont., will be entertained by Blackfoot Indians, such as these at Kerr Dam, in tribal ceremonials.

THE S&C



"FLIPPER" GIVES YOU

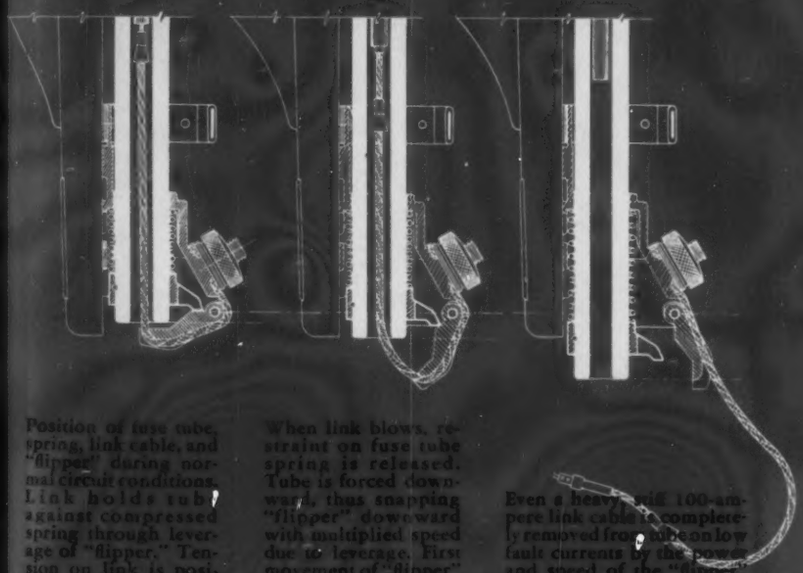
- **Quicker Action**
- **Shorter Arcing Time**
- **Longer Cutout Life**

S & C's cable "flipper" at the bottom of the fuse tube of the SEB Semafor Cutout, insures *positive* separation of the link terminals.

How the "flipper" does this is illustrated in the adjacent diagrams.

By using the S & C Box Cutout you get fast, reliable interruption of fault currents from dead short circuits down to high impedance faults just sufficient to melt the fuse link . . . Shorter arcing time results in reduced system disturbance and longer life for your cutouts.

Other important advantages of S & C Cutouts are described in detail in Bulletin 215-A. Let us mail you a copy.



Position of fuse tube, spring, link cable, and "flipper" during normal circuit conditions. Link holds tube against compressed spring through leverage of "flipper." Tension on link is positive and continuous, but limited to safe value.

When link blows, restraint on fuse tube spring is released. Tube is forced downward, thus snapping "flipper" downward with multiplied speed due to leverage. First movement of "flipper" pulls cable in a direction straight out of tube.

Even a heavy-grid 100-ampere link cable is completely removed from tube on low fault currents by the power and speed of the "flipper" action in combination with generated gas pressure.

S & C Type SEB Semafor Enclosed Cutout, 50 and 100 Amp., for 5000 and 7500 / 12500Y Volt Systems.

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4435 Ravenswood Ave. Chicago, Ill.
Manufactured in Canada by Powerlite Devices, Ltd., Toronto, Ont.

S&C

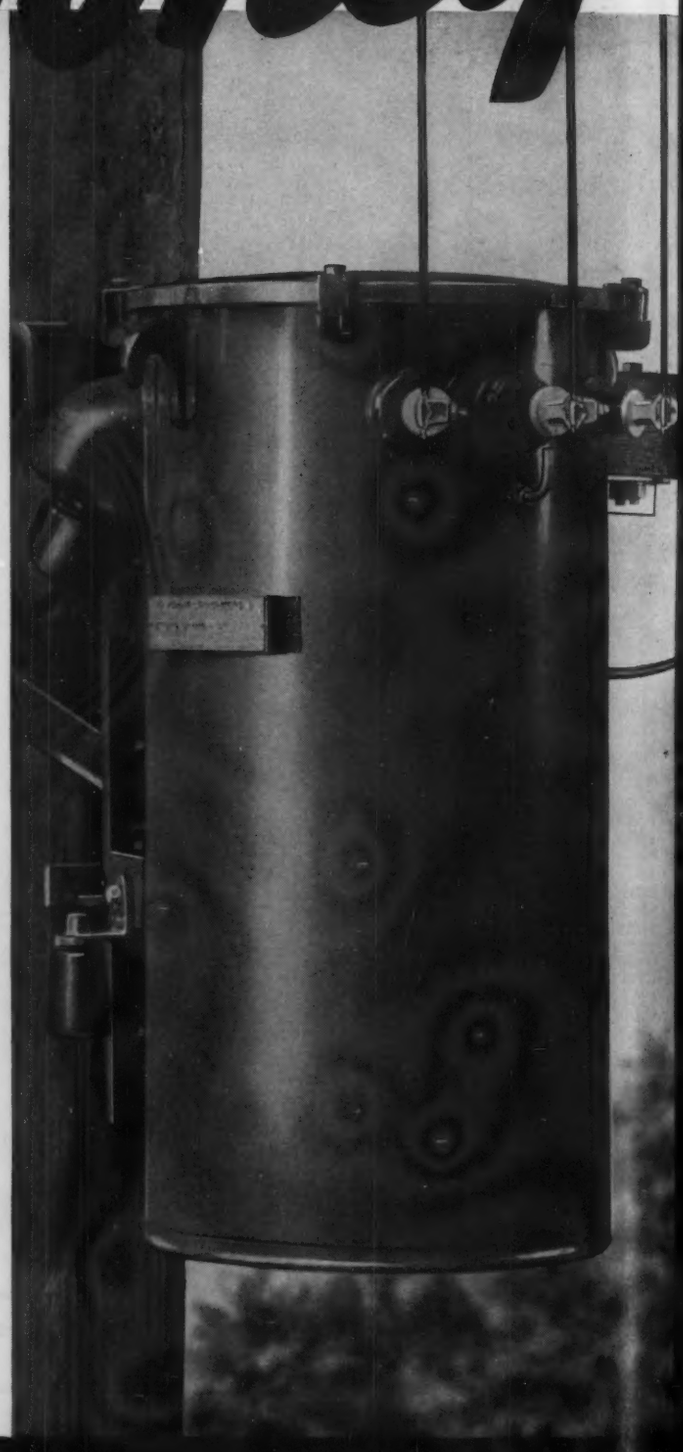
SEMAFOR ENCLOSED CUTOUTS

IT'S A Money

Quick Facts on the New Allis-Chalmers Distribution Transformer!

Here's Greater Value AT NO EXTRA COST!

1. Revolutionary Cadmium-plated 3-Way Terminal Cuts Installation Time... Simplifies Wiring Job... Minimizes Electrolytic Action on Copper or Aluminum Conductors.
2. New, Durable Steel Tank, Tested Under Pressure ... Prevents Oil Leakage ... Assures Long Life.
3. New Spra-bonderizing...Plus Triple Coat Automobile Finish ... Gives Positive 4-Way Rust Protection.
4. Double Conductor Insulation Provides Double Safety Against Winding Failures.
5. Time-proven Core and Coil Construction ... Designed for Years of Efficient, Service-free Operation.
6. Extra-heavy Porcelain Coordinated Bushings with Liberal Creepage ... Offer Maximum Reliability Under Fog, Dust, Chemical, or Other Adverse Operating Conditions.



ALLIS-CHALMERS DISTRIBUTION

-Saver ON THE POLE, AND ON YOUR POCKETBOOK, TOO!

EASY INSTALLATION . . . freedom from service interruptions . . . greater dependability — that's what Allis-Chalmers engineers were shooting at when they designed the new Allis-Chalmers Distribution Transformer.

And the great engineering features they built into that transformer speak for themselves!

Notice how the big 3-Way Terminals are heavily coated with cadmium so they can be used with *both* aluminum and copper leads . . . how their simple, fool-proof construction points to big savings in installation time.

Take a close-up view of the husky steel tank. It's tested under pressure to eliminate oil leakage . . . and it's bonderized and given a triple coat automobile finish for positive protection against rust.

For the inside story . . . look in the tank! You'll find new coil perfection there . . . dictated by Allis-Chalmers' over 40 years of building distribution and power transformers for utilities throughout the world.

And you'll see that all windings are double insulated. That's for *added* safety and *double* protection against winding failure.

Then look at the price! You'll be surprised to find that this new Allis-Chalmers Distribution Transformer, with all its engineering advancements, costs no more than ordinary distribution transformers.

Learn the whole story of *all* the extra-value, cost-cutting features you get in the new Allis-Chalmers Distribution Transformer. Call the nearest Allis-Chalmers district office or write for new Bulletin B-6096, Pittsburgh Works, Allis-Chalmers Mfg. Company.

A-1235

SEE HOW THE NEW 3-WAY TERMINAL WORKS! First and second pictures show how simply and easily leads can be brought to the transformer from both top and bottom. But you don't stop there! For the third picture illustrates an ***extra*** advantage you get with no other terminal! If necessary, leads can be brought straight out from the transformer, without making an extra bend in the conductors or complicating the wiring job. Notice how the tightening tool travels in an ***up and down*** direction eliminating the chance for accidental shorts across the secondary terminals. Notice, too, that a standard lineman's wrench is used. No special tools are needed. You don't have to buy extra fittings. Heavy cadmium plating of the 3-Way Terminal makes it possible to be used with ***both*** copper and aluminum conductors with a minimum of electrolytic action.

ON TRANSFORMERS *Cut Operating Costs*

Crapo
GALVANIZED STEEL
STRAND

RUGGED STRENGTH AND LONG LIFE AT LOW COST

EVERY physical characteristic essential to high strength, long life and trouble-free maintenance is combined —with sound economy—in *Crapo* Galvanized Steel Strand.

The superior tensile properties inherent in steel are used to fullest advantage in this time-proved product. The heavy, ductile, tightly-adherent zinc coatings—applied by the *Crapo* Galvanizing Process—provide lasting protection against corrosion, increase the life of the strand beyond the normal period of replacement. Correctly controlled ductility makes *Crapo* Steel Strand easy to serve. Characteristic ruggedness enables it to withstand the punishment encountered both in construction and in service.

The low first cost and low yearly cost of *Crapo* Galvanized Steel Strand result in important economies to many of America's leading utilities. *Crapo* Galvanized Steel Strand is available in all standard grades and sizes from representative jobbers located in principal distributing centers. Consult the distributor of *Crapo* Galvanized Products near you, or write direct for further information!

Crapo Galvanized Products also include *Crapo* HTC-130 and HTC-80 Steel Conductors (Solid and Stranded 3-Wire), Construction Wire, Tie Wire and Ground Wire.

INDIANA STEEL & WIRE CO.
MUNCIE, INDIANA

NEW PRODUCTS

"Deep-Freeze" (801)

Introduction of a household-frosted-food locker box will take place next month throughout the country. America's first sub-zero locker box for the home will be named "Deep-Freeze." It will be built in one-barrel and the two-barrel capacities. W. L. Morrison, a consulting engineer on the staff of Motor Products Corp., invented this new kind of refrigerating unit, which eliminates the customary vacuum of the refrigeration cycle. The Deep-Freeze unit operates on back pressure—thus cutting power consumption drastically. The compressor is housed under a small hood at the side.

Milk-Cooler (802)

A large-capacity milk cooler of a new compact arrangement has been announced by The York Ice Machinery Corp. It is of the cabinet type, and practically 100% stainless steel, inside and out. The cooler is of sanitary construction, with plates of convenient length, allowing complete visibility of every square in. of surface and requiring minimum effort in cleaning. The unit has hinged covers all around, corrugated cooler sections.

Utility Circuit Breaker (803)

A new line of type AB general utility circuit breakers for enclosure, panelboard or switchboard mounting has been introduced by Westinghouse. These breakers, rated 50, 70, 90 and 100 amp. at 250 and 600 volts a.c., 2 and 3 pole, and 125, 250 volts, d.c., are especially adaptable to lighting and feeder circuits, and motor branch circuit protection. All breakers use the 100 amp. frame, permitting physical interchangeability. Most important improvement is the adjustable magnetic strip. This feature permits very close setting of the breaker for any tripping current from 3½ to 11 times the breaker's normal rated current.

Our Banking Service Right at Your Doorstep

You don't have to bring your business to us to enjoy the facilities of this old, metropolitan bank. Rather, we take our services to you—by mail —no matter where your business is located. Our Bank-by-Mail Service will save your time; perhaps money, too. Why not open an account today, by mail?

CROCKER FIRST NATIONAL BANK
OF SAN FRANCISCO
California's Oldest National Bank
Member Federal Deposit Insurance Corporation

THERE ARE "BESTS" IN EVERY INDUSTRY

IN ELECTRICAL APPLIANCES IT'S

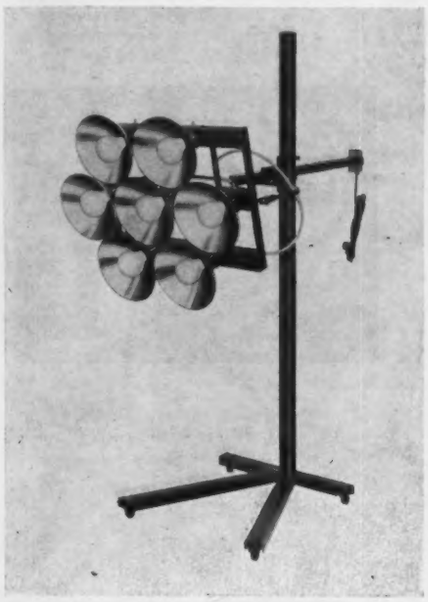
Sunbeam

Automatic **MIXMASTER**
Double Automatic **IRONMASTER**
SILENT AUTOMATIC TOASTER
Automatic **COFFEEMASTER**
SHAVEMASTER
FLAT TOASTER • FAN HEATER
GLASS COFFEE MAKERS
WET-PROOF HEATING PAD
MASTER PLUG & CORD SET

MADE AND GUARANTEED BY
CHICAGO FLEXIBLE SHAFT COMPANY
5600 West Roosevelt Road, Chicago, Illinois
316 Commercial Street, Los Angeles, Calif.
224 S. W. Temple Street, Salt Lake City, Utah
557 Market Street, San Francisco, Calif.
50 YEARS MAKING QUALITY PRODUCTS

Flexible Bank (804)

A portable flexible bank for infra-red baking and drying has been developed by The Fostoria Pressed Steel Corp. It is equipped with model IR, pure gold-plated Para-Sphere reflectors, completely wired. It is especially



designed for use on paint and enamel repair jobs such as automobile fenders and bodies. The bank of seven Para-Sphere reflectors will handle areas up to approximately 30 in. in diameter and can be instantly adjusted to any bank position desired and to a height of from 18 in. to 6 ft.

New ABC Washer (805)

A larger capacity, lower-priced ABC washer has been put on the market by Altorfer Bros. Co. This new unit has a sturdy 4-spring suspension wringer with instantaneous touch release that is automatic adjusting, large balloon rolls, exclusive ABC French type agitator with rubbing surfaces on wings and base, and an enclosed silent gear mechanism. It has a new one-piece solid steel chassis and a full-powered Westinghouse motor, rubber mounted.

Ultra-Violet Floodlighting (806)

Black lights for extremely high-powered ultra-violet floodlighting are available through the Continental Lithograph Corp. Specially designed for maximum efficiency with an important means of promoting long lamp life. Model 70 has an output of harmless, invisible "near" ultra-violet energy about 2½ times that of series 90 models. Beam spread is approximately 120 degrees. Model 70 is for portable use, ready to plug into 110-125 volt, 60 cycle, a.c.

G-E Pyranol (807)

Extension of Pyranol to induction voltage regulators has been announced by General Electric. Pyranol, a synthetic, non-inflamable liquid with high stability characteristics, has been used as an insulating and cooling liquid

RUBBER COVERED POWER CABLE • BUILDING WIRE
VARNISHED CAMBRIC • FLEXIBLE CORDS • LEAD ENCASED AND PARKWAY CABLES • ARMORED CABLE
CRESFLEX NON-METALLIC SHEATHED CABLE • SERVICE ENTRANCE CABLE • MAGNET WIRE • BARE WIRE

CRESCENT

GENUINE

A.B.C.

Armored Bushed Cable

1. CONDUCTOR — flame retarding, printed showing size, type of insulation and voltage.
2. BUSHING—easy to insert as paper unwraps from under both ends of armor to make room for the bushing.
3. STEEL ARMOR — low resistance, electro-galvanized giving longest life.
4. Thoroughly tested at several points during manufacture and receiving a final test of 2000 volts between conductors and armor.
5. *CRESCENT has unexcelled facilities for the complete manufacture of Armored Bushed Cable in all its steps. When you buy CRESCENT A. B. C. ARMORED BUSHED CABLE you buy the best. Do not be satisfied with any substitute.*

CRESCENT
INSULATED WIRE & CABLE CO. INC
TRENTON, NEW JERSEY

LOS ANGELES
Tri-State Supply Corp.
544 S. San Pedro St.

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Hodges & Glomb
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KANSAS CITY
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2627 McGee St.

CRESCENT ENDURITE SUPER - AGING INSULATION

The MOST COMPLETE LINE OF Service Connectors

LARGEST VARIETY of types, and a COMPLETE range of sizes. For all kinds of conductors.

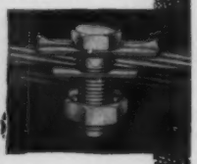
Popular connector at left is carried in stock in ALL sizes, up to 1,000,000 CM. Furnished with or without retainer.

ANY MATERIAL — Hardware Bronze, Silicon Bronze, Aluminum.

MILLIONS IN USE and never one rejection due to performance or workmanship. Can be re-used over and over.

MADE IN OUR OWN PLANT under engineering supervision. Bodies and nuts precision machine-threaded for perfect fit. No sharp edges.

ALUMINUM Connectors machined from hard drawn rod, with forged spacers.



SERVICE POST Connectors for one or more conductors; many types.

SERVICE ENTRANCE Connectors with extruded copper bodies, Everdur screws.

TELEPHONE Service Connectors, brass rod—plain, nickel plated or tinned.

And THOUSANDS more—write for Catalog.

NICHOLAS & COOK
1063 HOWARD STREET
SAN FRANCISCO

J. W. WATKINS
538 SKINNER BLDG.
SEATTLE

PENN-UNION ELECTRIC CORP., Erie, Pa.

PENN-UNION Conductor Fittings

for G-E Pyranol transformers, and as a dielectric treating and filling material for G-E capacitors since 1932. All the features of G-E oil-filled induction regulators are incorporated in the Pyranol line, which is available in all standard ratings. Costly fire-proof vaults normally required for indoor installations are no longer needed with the advent of these new regulators.

Kitchen Ventilator (808)

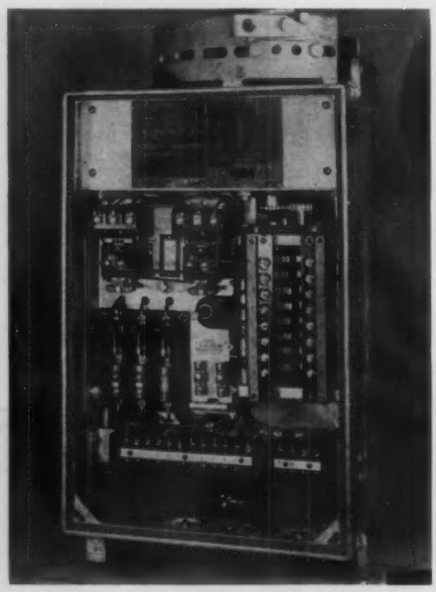
A kitchen ventilator that fits right over the top of the range with a powerful centrifugal exhaust unit built into the top of its hood has been presented by The Vent-A-Hood Mfg. Co. In addition to eliminating cooking odors, this ventilator has a patented built-in grease trap that prevents greasy deposits from accumulating on the walls and woodwork. The trap is removable for easy cleaning. Current used in operation of ventilator is said to be equal to that used by a 50-watt electric bulb.

Germicidal Lamp (809)

Development of a yard-long 30-watt germicidal "lamp"—a clear glass tube 1-in. in diameter, designed to kill air-borne bacteria—was presented recently by General Electric's Lamp Dept. This new lamp is twice as long as the longest of the other units in the line. It is more than twice as effective in killing germs as is the 18-in. 15 watt size. Like this 15-watt tube, the new germicidal lamp is equipped with a medium bipin base at each end.

Air Switch Mechanism (810)

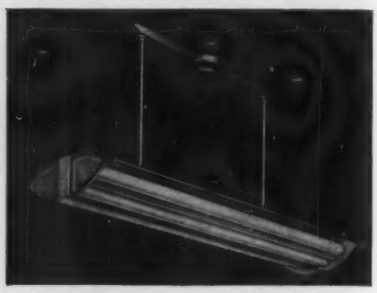
A motor operating mechanism for air switches has just been completely redesigned by the Railway & Industrial Engineering Co. This new mechanism is the Type MO-9, and supersedes the Type MO-8. It is larger, heavier, and even more reliable. All vital parts are easily accessible for inspection or test as covers are removable without danger



of contact with live parts. It can be furnished for operation at any of the following ratings:—24, 48, 125 and 250 volts, d.c., 110 and 220 volts, a.c. Contactors are vibration proof, solenoid type.

Guth Luminaire (811)

A new store and office luminaire for use with fluorescent lamps, called the Tru-Co-Lite, has been manufactured by the Edwin F. Guth Co. Its engineered reflectors enhanced by the Alzak process, deliver 85% downlight with wide light distribution and 15% uplight for ceiling illumination. The fixture is sturdily built with reinforcing cast aluminum ends.



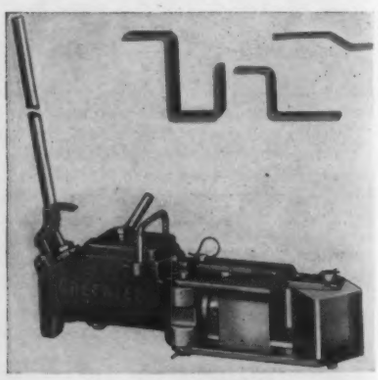
It is available for 4- 40-watt lamps or for 4-20-watt lamps. It is wired complete with 95-100% power factor accessories and with separate starter switches.

Wire Rope Connector (812)

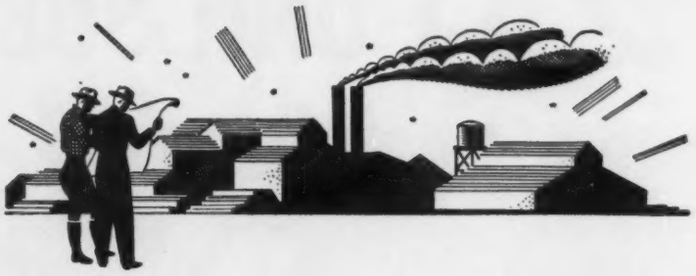
An improved wire rope connector that damps line vibration stress has been introduced by the Electroline Co. It grips the cable with graduated compression, feathering off from maximum at the rear to zero at the front. This design prevents "weak-point" crystallization at the point of connection and thus insures longer rope life. The connector is a compact, streamlined assembly of three simple units—a sleeve which slips over the end of the wire rope, a tapered plug which is inserted to separate and hold the strands of wire in the sleeve and a covering socket which securely locks the cable.

Bus-Bar Bender (813)

A bus-bar bender has been added to the Greenlee Tool Co. line of hydraulic benders for rigid conduit, pipe and thin-wall steel tubing. The bender will handle bars up to 4 in. wide and ¾ in. thick. Accurate U-bends



of any size can be made, ranging upward from the small U with a 3½ in. inside width. The tool illustrated here, No. 770-BB, consists of the standard power unit, fitted with the bus-bar bending attachment.



Shell respectfully bids for your business on the basis of the Safety Factors in Shell industrial lubricants.

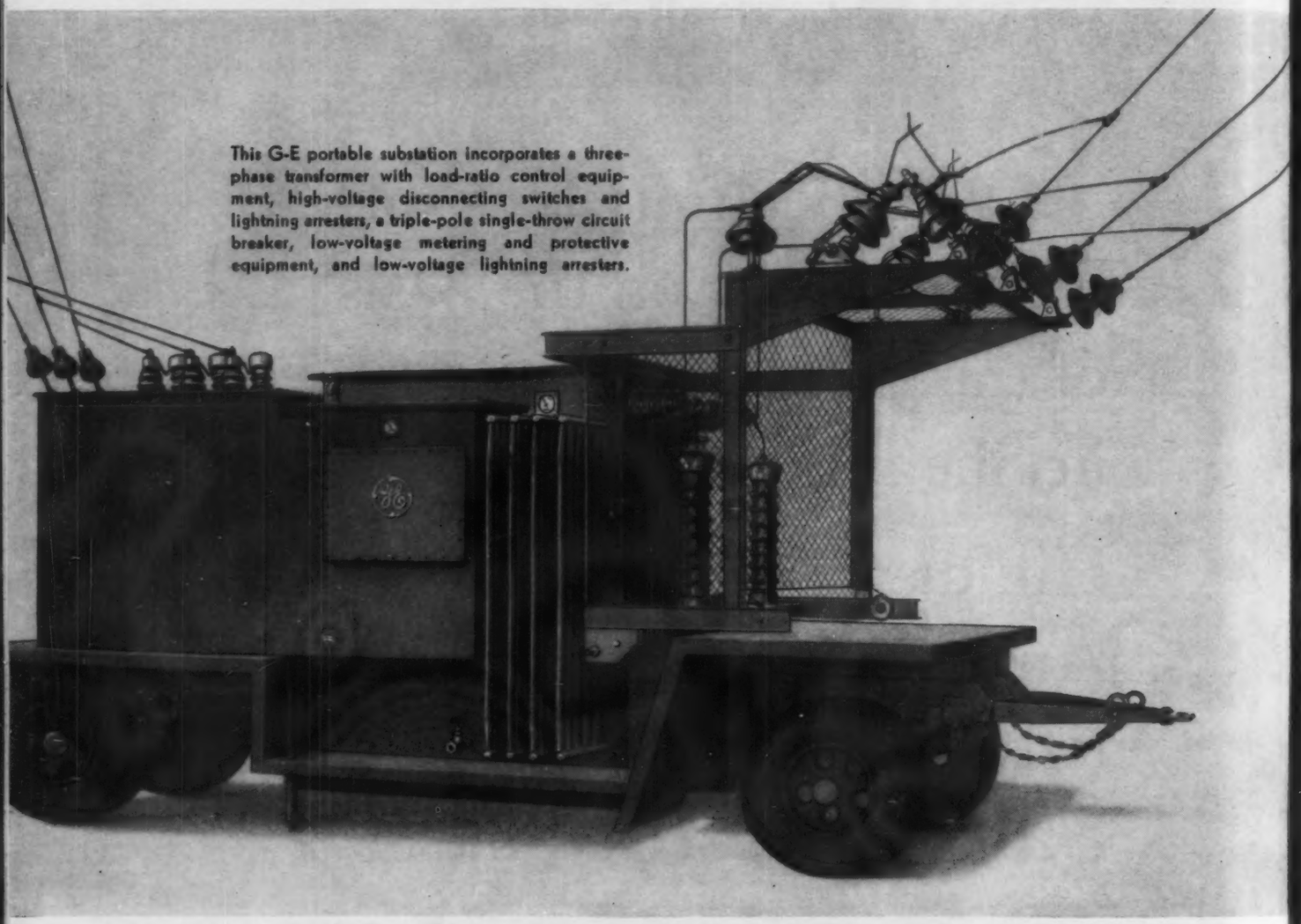
Hundreds of leaders in American industry can tell you that these Safety Factors mean

- **better control of friction heat and combustion heat**
- **slower rates of wear**
- **increased power offtake**
- **savings on shutdown losses**
- **reduced outlay for lubricants**

SHELL

If you're wondering "what are these Safety Factors?...what specific savings can they offer me?"... call up your local Shell office. We promise you that every minute you give the Shell representative can pay you back substantial dividends.

Now G-E UNIT SUBSTATIONS



This G-E portable substation incorporates a three-phase transformer with load-ratio control equipment, high-voltage disconnecting switches and lightning arresters, a triple-pole single-throw circuit breaker, low-voltage metering and protective equipment, and low-voltage lightning arresters.

These Features Make Transportation Easy and Simplify Operations on the Job

1. The new G-E portable substation can be towed readily by a line-service truck.

2. Over-all height is 10 feet (Maximum heights permitted by laws vary from $11\frac{1}{2}$ feet to no limit).

3. Unit designed to meet regulations concerning weight and size. Trailer is regularly equipped with two-line vacuum air brakes with reservoir, and other safety features.

4. Correct weight distribution contributes to stability of unit, and special coupling prevents weaving on the road.

5. Trailer is built for full jack-knifing. Large steering circle on front axle maintains stability when turning.

6. Ingenious mounting of high-voltage disconnecting switches permits them to be elevated to a safe height above ground for operation.

7. Other external live parts are screened to prevent accidental contact.

8. All compartments, valves, and operating handles can be locked to prevent operation by unauthorized persons.

GENERAL ELECTRIC

PRINT IN BINDING

GO PORTABLE

to Make It Easier, Quicker, and More Economical for You to Provide SERVICE in EMERGENCIES— CAPACITY for TEMPORARY LOADS

CO-ORDINATED design, compactness, ease of installation—in fact, all the advantages of G-E unit substations for permanent installations—are now offered for the first time in a *portable* unit. This unit is delivered completely assembled and mounted on a specially designed trailer, ready to go into service. From stem to stern, the design of apparatus and trailer has been co-ordinated to provide ease of transportation, and to assure reliability and safety in service.

With one of these new portable unit substations you have a *complete* substation ready to travel at a moment's notice to any point on your system where emergency service may be required or where temporary loads may require increased capacity.

"Installation" of the new portable substations is merely a matter of parking the unit in the desired location, elevating the retractable high-voltage-disconnecting-switch structure, and running conductors to the high-voltage and low-voltage lines.

TWO TYPES AVAILABLE

For providing the desired balance between size, weight, and output—

WITH SELF-COOLED TRANSFORMER—especially suited to the smaller sizes. They require no attention and are ideal for duty that may include extended periods of continuous service.

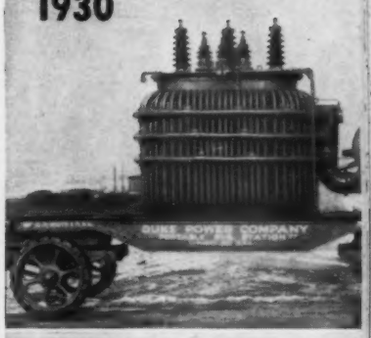
WITH FORCED-COOLED TRANSFORMER—to provide increased output for a given weight, or the same output for less weight—ideal for fast-stepping emergency service.

Standard Ratings to 2000 kva

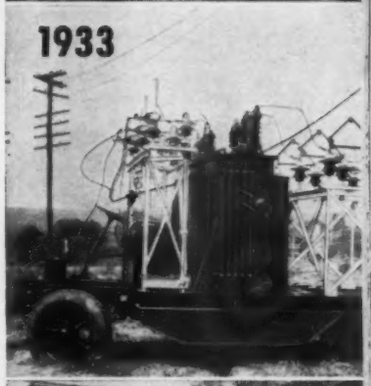
This 1080-kva, 2300/4000-volt equipment was recently built in our Pittsfield Works for the Pennsylvania Power and Light Company

Here Are a Few of the Pioneer Portable Substations for Which G.E. Supplied Equipment

1930



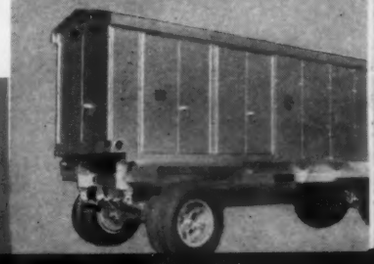
1933



1936

1939

Portable Capacitors, Too



Manual Motor Starter (814)

One of the new line of Colt Motor controls is the across-the-line type manual motor starters. Furnished in sizes "0" and "1" designed for the starting, stopping, and overload protection of single phase and polyphase motors up to 7½ hp. The wide range of applications for these new Colt manual starters on production tools includes grinders,

lathes, milling machines, looms, drill presses, profilers, planers, etc. Feature of the unit is the automatic relatching mechanism which eliminates any resetting operation as there is no intermediate or tripped position on the starter handle. Operation is "handle free."

Flash Bulb Extension (815)

To the electrician, serviceman and lineman who finds needs for a closely spotted light in hard-to-get-at places, a novel flashlight bulb extension has been developed. Made in lengths from 6 in. to 3 ft., the extension's plug is screwed into any flashlight with the bulb in the opposite socket. Known as the Sierra flashlight bulb extension, the device is made by the Sierra Aircraft Co. and is of special wire encased in high-grade aluminum alloy tubing. Being bendable, it can go into intricate wiring. Poorly lighted switchboards, bus lines or transformers may be easily inspected.

G-E Ironer (816)

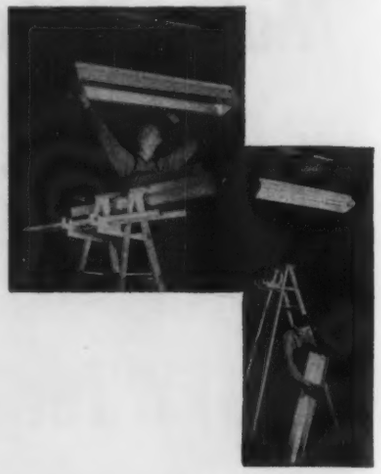
A new rapidly performing electric ironer of the rotary type, so light in weight that it may be carried easily and used on any convenient working surface, has been introduced by General Electric appliance and merchandise department. It is designed with an open end for convenience, and its roll—6 in. in diameter and 22 in. long—lends itself to the ironing of sheets, tablecloths, dresses, and other garments. It weighs 33 lb. with an ironer shoe, designed for low current consumption. Full length contact with the shoe provides even heat.

Lumo Floodlight (817)

The Lumo aluminum floodlight is the latest addition to the line of lighting equipment manufactured by the Goodrich Electric Co. Designed for accurate light control and high efficiency, Lumo floodlight may be used individually or in combination to obtain highly uniform intensities over large areas. Available for pole or crossarm mounting, the installation, wiring and servicing is facilitated by two piece hood construction with removable caps. It is constructed of electro-chemically processed aluminum and is made in both open style and with heat-resisting glass lens.

Flu-O-Flector (818)

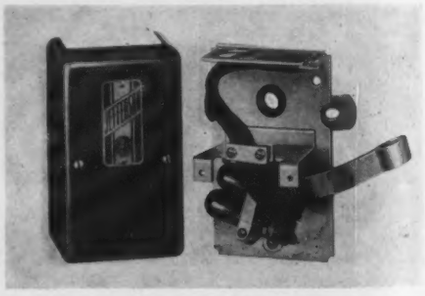
Called the utility Flu-O-Flector, a fluorescent fixture manufactured by The Edwin F. Guth Co. provides better maintenance as well as efficient light control. The illustration shows maintenance man on ladder disengaging separate inner reflector from the protective steel housing. The reflector is removed



by unscrewing two large knurled nuts. With extra reflectors on hand, maintenance crews simply take down the dirty reflectors and substitute reflectors that have been cleaned on the floor or on the bench.

All-Round Control Switch (819)

An all-round control switch in which circuit is made and broken inside ferro-tube mercury contacts has been added to its line of pressure and float switches by the Jefferson Electric Co. These switches can be operated by hand, by foot treadle, float or pressure in connection with signals, relays, etc. The design is simple and the device easy to install.



Capacity up to 1,875 watts per mercury contact (resistance load) on circuits up to 440 volts a.c. and 250-volts, d.c. for ¼ hp. a.c. split phase motors, ½ hp. a.c. capacitor motors and ¾ hp. a.c. repulsion motors.

Straight Line Splice (820)

An insulated straight line splice has been developed by Reliable Electric Co. for use in sectionalizing secondaries, for secondary banking, for series street lighting, wherever a break is needed in the line. These splices can be inserted in the line without deadening or cutting in additional wire, and may be installed on secondaries without removing wires from structure. They consist of two straight-line dead end units attached to an insulating section of strong and tough plastic which has high dielectric strength and will not carbonize nor absorb moisture.

ANNOUNCING!

A New Greenlee Bus-Bar Bender... BENDS BAR UP TO 4-IN. WIDE, ¾-IN. THICK

The Greenlee Hydraulic Bus-Bar Bender, now ready for the power utilities and electrical contractors, has been developed to bend, easily and quickly, bus bars up to 4" wide and ¾" thick. With this bender it is now also possible to make accurate U-bends of any size, ranging upward from the small "U" with a 3½" inside width. The bus bar bending attachment has been made to fit the power unit of the regular Greenlee No. 770 and No. 770-T Conduit Benders, and can be purchased as a separate attachment for this Power Unit or as a complete Bus-Bar Bender with power unit and attachment together. Why not find out how this new tool can save you money on new installations and repair jobs?

Let Us Send Complete Details

GREENLEE TOOL CO., 1703 Columbia Ave., ROCKFORD, ILL.

INDUSTRY UNITES TO CAPITALIZE ON GREAT SALES OPPORTUNITY

ELECTRIC WONDERLAND—with every prospect an Alice, thrilled and delighted at the electric cooking marvels that you show her. That's The Modern Kitchen Bureau's Electric Range theme for the fall of '40—a NEW promotion with a NEW twist by which dealers, utilities and manufacturers coordinate nation-wide activity to capitalize on a great range sales opportunity.

Tie into it with everything you've got—and everything we give you! Use the powerful sales and advertising aids furnished by MKB—including the mystifying MAGIC MIRROR display. Participate in the big Alice in Electric Wonderland stage shows to be produced by local bureaus, electric leagues and utilities. Ride the tail of national advertising as it continues to push the electric range sales curve on to higher peaks.

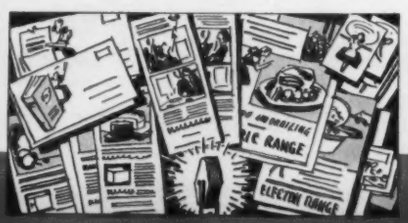
For further information, check your electric league, distributor, utility. Or write:

THE MODERN KITCHEN BUREAU
420 Lexington Avenue, New York, N. Y.

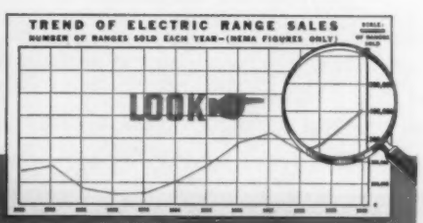
***FLASHER OFF**—prospect sees a perfectly reflecting mirror at which she can stop and primp.*

***FLASHER ON**—prospect sees "Through the Looking Glass," Alice at her range in Electric Wonderland.*

Electric Wonderland Demonstrations Give Mass Selling Hour-and-a-half stage shows—designed for joint dealer-utility selling—provide space for your own demonstration booth and let you share in large scale selling effort no dealer could attempt alone.



Sales Promotion Material Dramatizes Your Advertising Every sales help from letterhead stickers and direct mail pieces to newspaper mats, radio spots and window display materials. Use it all and let it BOOST YOUR SALES.



Great Sales Opportunity For You. UP—UP—UP goes the Electric Range sales curve for '40, hitting a new all-time high. Get aboard the band-wagon. This biggest promotion in history helps you CASH IN NOW.

ESTATE • FRIGIDAIRE • GENERAL ELECTRIC • GIBSON • GLOBE-AMERICAN • HOTPOINT • KELVINATOR • MONARCH • NORGE • STEWART WARNER • UNIVERSAL • WESTINGHOUSE

Every house needs
Westinghouse

I'M ALICE IN Electric WONDERLAND—
HEADLINING YOUR NEW 1940 FALL
ELECTRIC RANGE PROMOTION
INDUSTRY UNITES TO CAPITALIZE
ON GREAT SALES OPPORTUNITY

THE M. K. B. FALL RANGE DRIVE IS THE BIGGEST AND BEST EVER!

...AND WESTINGHOUSE HAS A TIE-IN PLAN THAT'S GOT EVERYTHING!*

* *and we do mean* EVERYTHING!

When you plan your "Alice in Electric Wonderland" electric range program this fall, be sure to include Westinghouse, the "Best Seller," for these TWO Big Reasons:

1. **You'll have a beautiful new range . . "The Harvester" . . . for fast fall selling.**
2. **You'll have another Westinghouse "Faster for '40!" Retail Sales Activity including:**

- **Twelve full page, full color ads in The Saturday Evening Post, Collier's, Life and Liberty.**
- **"Alice in Electric Wonderland" display *plus* other new display material.**
- **A "Give Away" that's a sure-fire traffic builder.**
- **Special fall newspaper advertisements.**
- **"Musical Americana" radio program every Tuesday night from coast-to-coast.**

The whole story will be told in FALL MERCHANDISE MARKETS to be conducted late this month by Westinghouse Distributors. Watch for the announcement and don't fail to attend!

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, DEPT. 196, MANSFIELD, O.

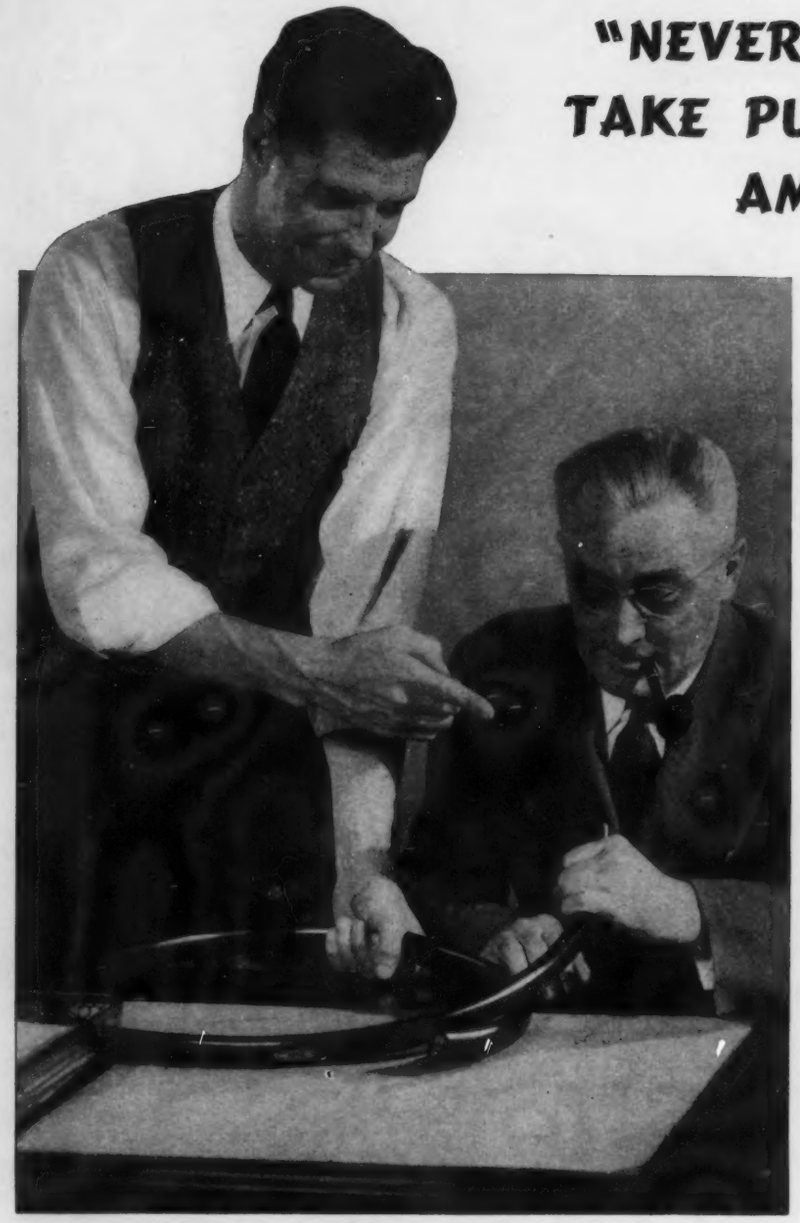
GET THE WHOLE STORY AT YOUR WESTINGHOUSE DISTRIBUTOR'S FALL MERCHANDISE MARKET, BEGINNING AUGUST 19.

Tune in "Musical Americana," N. B. C. Network, Coast-to-Coast, every Tuesday evening.

Westinghouse *Electric* Ranges

"The Leisure Line"

"NEVER SAW A CABLE TAKE PUNISHMENT LIKE AMERCLAD!"



ENGINEERS familiar with Amerclad find it hard to believe that anything made of rubber could be so tough. They've seen it dragged day after day through stony open-pit mines, run over by loaded mine cars, or exposed to water and grease and general machine-shop abuse. Yet it stubbornly resists damage, goes right on delivering power as though nothing had happened.

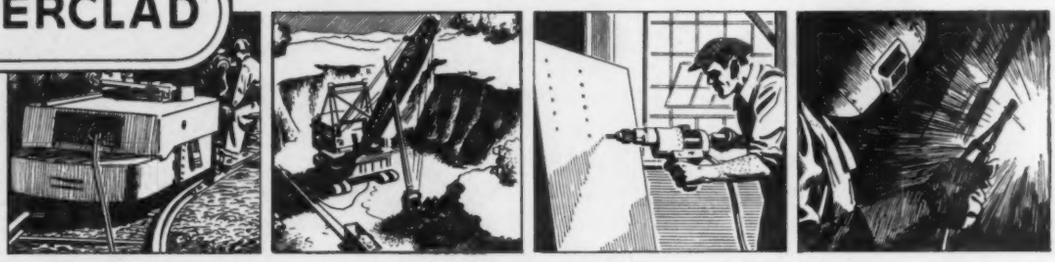
HERE'S AN INVITATION: Pick out your toughest portable cable job. Next time that cable needs replacement, replace it with Amerclad. You'll find that Amerclad has the stamina it takes to outwear your present cable. Often it outlasts two or three ordinary cables. And that means savings for you—both in replacement costs and lost time.

Amerclad owes its amazing toughness to a special rubber formula developed by years of research in the laboratories of the American Steel & Wire Company. Nothing but the finest Hevea rubber is used in its compounding. Its minimum tensile strength is 3500 lbs. per sq. in. Samples are required to stretch six times their own length before breaking. All Amerclad cables are vulcanized under enormous pressure, while encased in a heavy lead sheath that is afterward removed. This treatment bonds the rubber fillers and the jacket inseparably together to prevent tearing or stripping of the protective sheath.

AMERICAN STEEL & WIRE COMPANY **AMERCLAD**

IN THE MINES • ON ELECTRIC SHOVELS • FOR ELECTRIC TOOLS • FOR WELDING

Only genuine Amerclad Cables bear this identifying label, vulcanized right in the jacket. Make sure it appears on every cable you use in rough, abusive service.



COLUMBIA STEEL COMPANY, *San Francisco, Pacific Coast Distributors of U·S·S Amerclad Cords & Cables*

Manufactured by

AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago and New York*

United States Steel Export Company, New York

UNITED STATES STEEL

CHROMALOX
RANGE UNITS give

100 to 250% more CONTACT COOKING SURFACE

Write

MONTGOMERY BROTHERS
911 Western Ave., Seattle, Wash.
1501 N. W. Kearny St., Portland, Ore.
61 Fremont St., San Francisco, Calif.
420 S. San Pedro St., Los Angeles, Calif.
THE PETERSON COMPANY
1921 Blake St., Denver, Colo.
EDWIN L. WIEGAND CO.
7540 Thomas Blvd., Pittsburgh, Pa.

ALL KINDS
of SMALL
TRANSFORMERS

—in the JEFFRIES line

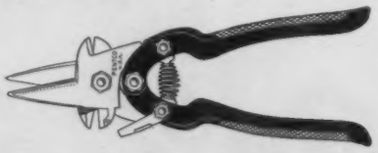
Practically all your small transformer needs are supplied by the Complete Jeffries line. We have specialized for years in providing transformers to **exactly** match your requirements. If not in our regular line, we build to meet your specifications—in a hurry!!

Minimize your voltage losses. Specify scattered transformers to eliminate duplicate conduit runs, and save on power costs.

JEFFRIES TRANSFORMER COMPANY
5706 Long Beach Ave. Los Angeles, Calif.

Master Cutter (821)

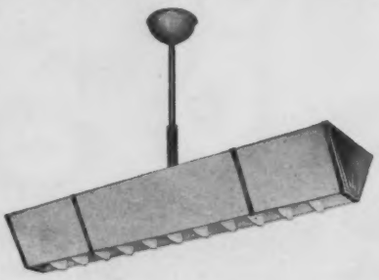
A new compound action combination electrician's master cutter snip, wire cutter and splicer has just been introduced by the Penn Tool Co. It will cut any grade metal up to 16 gauge, also flexible pipe and tubing. Also cuts wire, nails, etc. Tapered splicer cuts



off insulation from wire. The blades are made from chrome vanadium molybdenum steel, have serrated cutting edge that will not slip or turn.

New Fluorescent Unit (822)

In the Beacon, a fluorescent unit now manufactured by the Wakefield Brass Co., four 40-watt fluorescent lamps are shielded by means of diffusing glass. The bottom of the reflector is open. Direct view of the lamps is prevented by means of parallel louvers. All metal parts, including the ornamental hanger,



are finished in satin nickel. The decorations in the end caps are illuminated through sheets of translucent plastic material. It is particularly well adapted for office and store application.

Portable Air Grinder (823)

Based on an ingenious "Air Behind the Blades" principle, a new portable air grinder has been presented by the Independent Pneumatic Tool Co. This keeps the rotor blades

of the grinder out against the cylinder wall, preventing any "dead center" position or the depression of the blades in the slots due to oil accumulation. As a result, positive starting is assured under all operating conditions. This No. 255 grinder is but one of the complete Thor line.

Molded Plastic Unit (824)

A molded plastic unit for use in indicating lamp service, panelboards, switchboards, annunciators, etc., has just been introduced by the H. R. Kirkland Co. Known as the T2 unit, this device has an extremely small lens diameter which is said to make it suitable for hosts of applications where larger units cannot be used. Two spring tempered contact-terminal strips are the only electrical parts of the unit. They serve to contact the lamp bulb and to provide the incoming wire terminal connection.

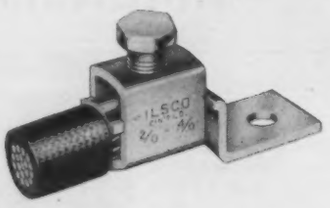
Swinglite (825)

A practical lamp that can be clamped or fastened to desk work bench, drafting board is the Swinglite, introduced by the Eagle Electric Mfg. Co. It has swing adjusting radius of over 180 degrees with safety stops to prevent swinging beyond maximum adjust-

ment and also preventing cord from being twisted; heavy cast clamp for attaching, adjusted by means of a thumbscrew, and is finished in baked Morocco bronze.

Solderless Lugs (826)

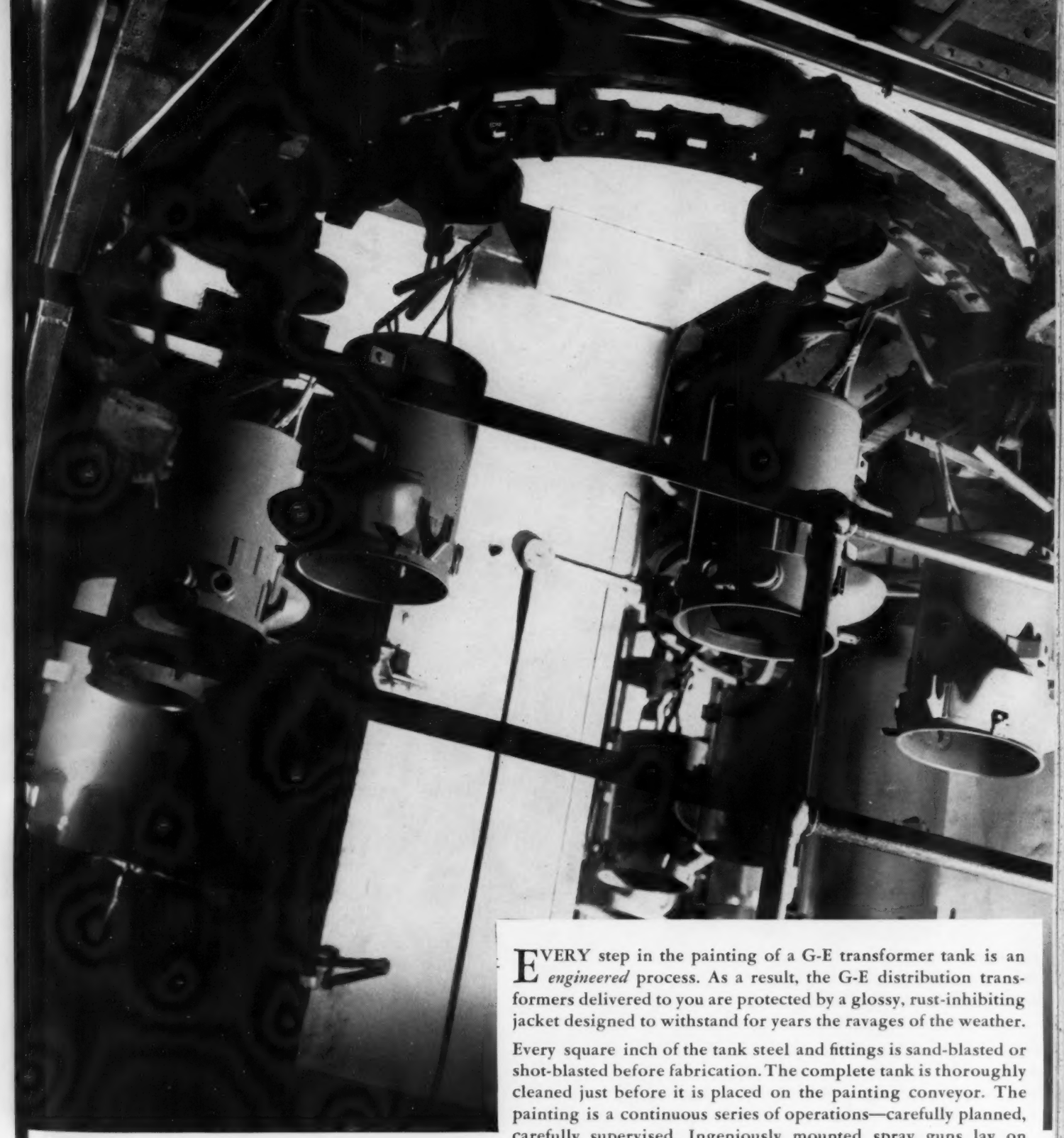
New solderless lugs and connectors have been presented by Ilsco Copper Tube & Products, Inc. Bearing surface of their tongues is arched to fit the curve of conductors held, so that maximum contact between tongue and conductor is assured, and tongue pressure distributed over the curve of wires



held. The arch also strengthens the tongue considerably. Short bar-like ridges or ribs project from inner, sloping walls of V-bottom collar, to assist in gripping wires "for keeps."

Oil Switch (827)

An oil switch for economical protection of distribution circuits or loads where interrupting duty does not exceed 2,000 amperes at



IN PITTSFIELD WORKS TANK SHOP

WE MAKE A SCIENCE OF PAINTING

EVERY step in the painting of a G-E transformer tank is an *engineered* process. As a result, the G-E distribution transformers delivered to you are protected by a glossy, rust-inhibiting jacket designed to withstand for years the ravages of the weather.

Every square inch of the tank steel and fittings is sand-blasted or shot-blasted before fabrication. The complete tank is thoroughly cleaned just before it is placed on the painting conveyor. The painting is a continuous series of operations—carefully planned, carefully supervised. Ingeniously mounted spray guns lay on smooth coats of paint; evenly heated baking ovens slowly transform each coat into a tough layer of resistance.

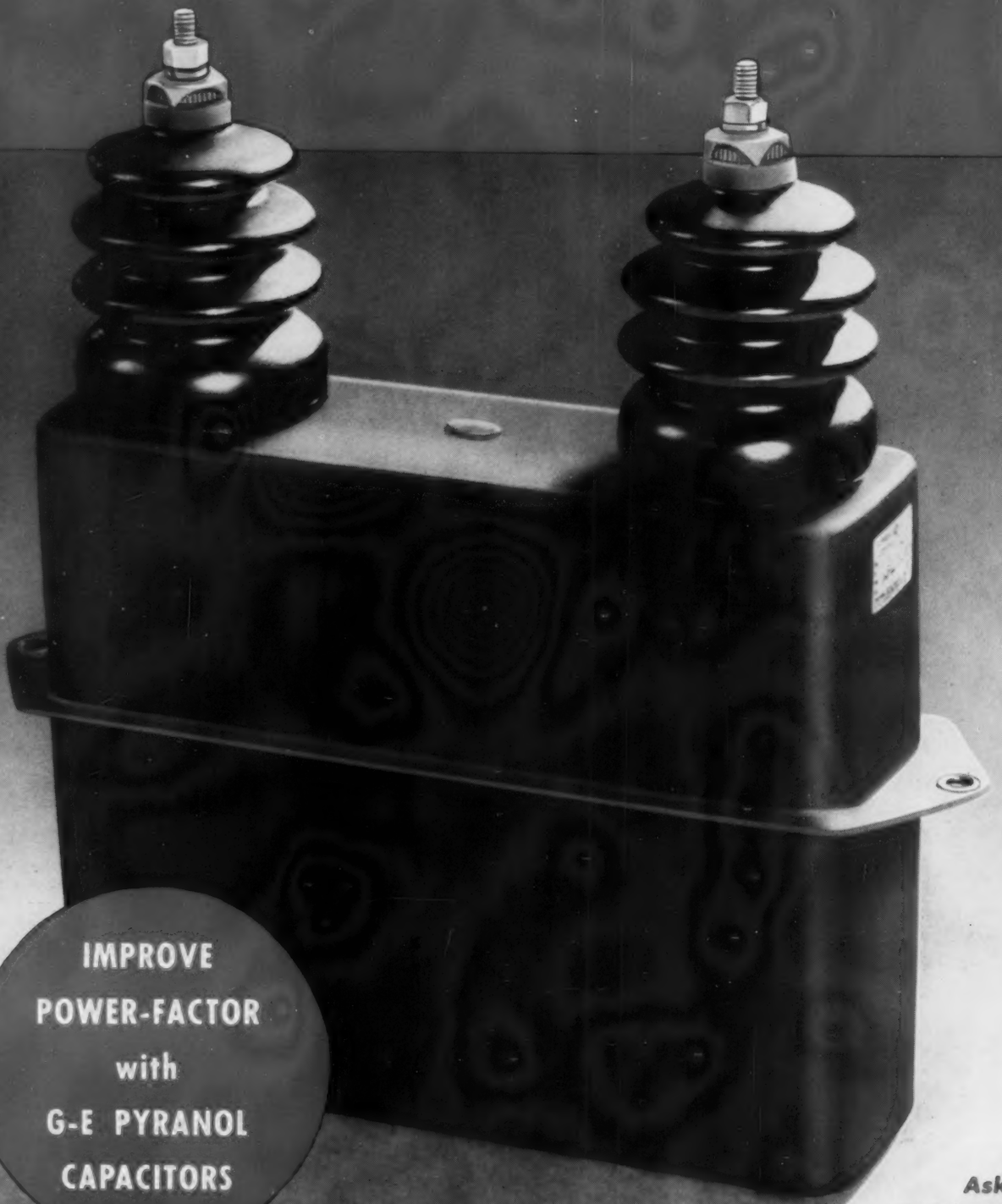
Both the priming and finishing paints are products of the G-E paint laboratory. Specially developed to resist oil and abrasion and to expand and contract with temperature, their use has greatly lengthened the life of the tank finish.

Tank finishing as we do it exemplifies the G-E policy of "perfection of detail"—a policy that utilizes every manufacturing ingenuity and every modern facility to provide better distribution transformers at the lowest possible cost to the user.

GENERAL ELECTRIC

402-15

The QUICK LOW-COST Way To Gain KW CAPACITY



IMPROVE
POWER-FACTOR
with
G-E PYRANOL
CAPACITORS

Ask for
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GENERAL ELECTRIC

407-7

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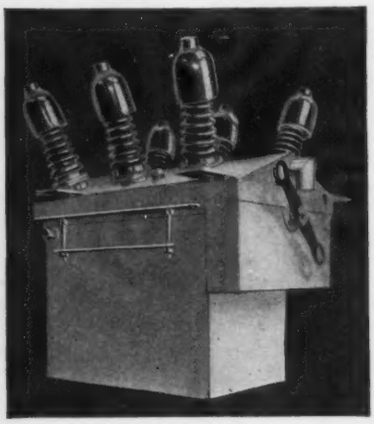
15 kv and continuous current capacity does not exceed 100 amperes has been introduced by Pacific Electric Mfg. Corp. It can be used



for protection of rural loads; has two expulsion chambers per pole, auxiliary switches, automatic series trip mechanism; is manually closed; has readily-visible position indicator.

PRODUCT DATA

Keep Posted for 1c

Your being right up-to-the-minute may have an important bearing on your success. New developments are appearing daily in your field—tools to help you do a better job. Are you abreast of them? You fall back a step when the other fellow is well informed about a subject of which you are ignorant. Manufacturers' publications are a quick, efficient way for you to keep posted on current events in your field.

Isn't it a bargain to invest 1c (the cost of a postcard) to help earning power to which you look forward? American industry is offering a remarkable service—free. ELECTRICAL WEST makes it easy for you to enjoy this service for your own. Check and mail the coupon below. That's all you have to do to help yourself toward better performance and greater rewards.

Air Circuit Breaker (828)

A 16-page two-color illustrated booklet covering the entire line of Westinghouse air and compressed air circuit breakers from the type AB starting at 15 amp., up to the type CA which has interrupting capacities up to 1,500,000 kva. is offered by Westinghouse Electric & Mfg. Co. The booklet gives a short history of the development of the air circuit breaker, including the development of the "De-Ion" method of fast and positive arc quenching. Each type of air circuit breaker in the Westinghouse line is illustrated and briefly described. The latter half of the booklet contains valuable and interesting aplication hints for the various breaker types.

Okonite Research (829)

Result of a trip through the new research laboratories of the Okonite Co. is a handsome 32-page booklet on research which shows by means of many photographs and the briefest kind of text how a new insulation or protective sheath is developed. It follows the insulation as it is put into production and finally checked and tested to a fare-thee-well in laboratory and proving ground.

Transformers (830)

A 12-page illustrated leaflet describing the Type ASL air-cooled transformers for 60 cycle service in the 13,200 volt class and below and in ratings up to 500 kva. for single phase operation and 1,000 kva. for three phase operation has just been published by Westinghouse. The first booklet on the subject made available by any transformer manufacturer, it includes a complete description of the transformer along with its advantages over the conventional liquid-filled types.

Oil Circuit Breakers (831)

A new 12-page illustrated booklet describing "De-Ion Grid" Type "O" oil circuit breakers, designed for indoor service for voltages from 15,000 to 34,000 and for interrupting capacities from 500,000 to 2,500,000 kva., has just been published by Westinghouse Electric & Mfg. Co. Prime aplications are for breakers for mounting in masonry cells, steel cells, or in steel frames in industrial and power plants. Distinctive features, including decreased gas volume, tank pressure, oil deterioration, system disturbance, and maintenance are simply described in non-technical language. Cutaway sketches show the principal design features with supplementary photographs aiding their complete description and explanation. Accessories, including tank lifters, hand closing levers, control relays, and completely wired and assembled control panels are covered in successive sections. Wiring diagrams for two typical breaker controls are shown. Solenoid operating mechanisms are described, and fault clearing speed in cycles is given. A complete table of rating data, shipping weights and oil requirements, and dimensions make up the last several pages of the booklet.

Trico Clamps (832)

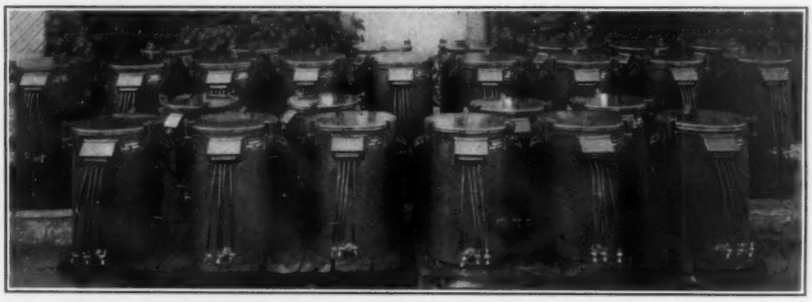
"Worth Their Weight in Gold" is the title of an informative broadside on Trico Kliplok Clamps for fuse clips. It tells how poor contact wastes millions of dollars—where to look for the trouble, and how premature blowings of fuses, arcing at contacts, wasteful shutdowns and unnecessary loss of production can be eliminated by locking fuse and clips together with Kliplok Clamps.

Saw Handbook (833)

A portable electric saw handbook has just been issued by Black & Decker Mfg. Co. The history of the saw is presented in this publi cation together with factors in engineering, construction features and excellent pictures of various units of equipment. Operating data clearly explains the advantages and correct accessories.

AT SHASTA! BUILT-TO-ORDER

TRANSFORMERS SIMPLIFY VOLTAGE PROBLEMS



Being used in the construction of Shasta Dam are these 26 5KVA 4160 volt to 120/240 volt 60 cycle single phase transformers with 3952/3744 primary taps. Complete with oil and hangers.

On the Shasta Dam project as on other large construction jobs, standard equipment will not always fill voltage requirements. Consequently, more and more Western contractors are using GARDNER Custom-Built Transformers to solve special voltage problems.

And no wonder! Gardner transformers have proved their worth. Under the worst operating hazards, they give dependable, trouble-free service.

Write TODAY for full information on the transformer that will solve YOUR voltage problem.

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Engineers and Manufacturers Representatives

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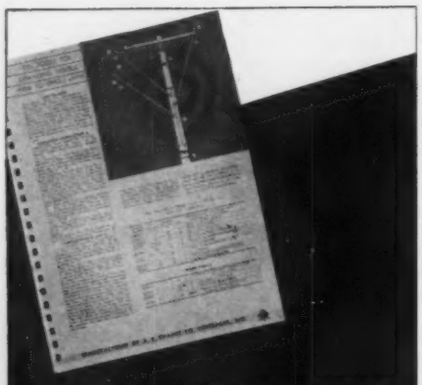
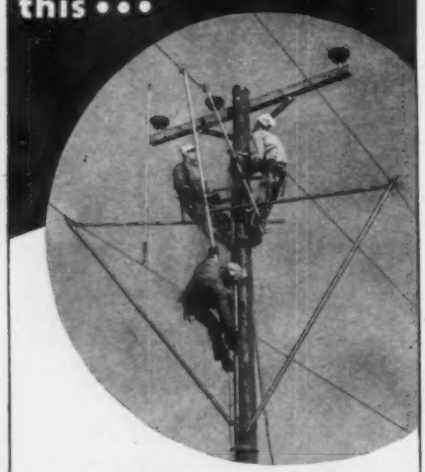


PAGES LIKE THIS show the simplicity safety and economy of doing jobs like this • • •



With TIPS TOOLS

You will see that hot line maintenance is reduced to its simplest, safest form when line crews are outfitted with Tips Tools. You will convince yourself that in many cases, this is the cheapest and quickest means of making line repairs and that in practically all cases, hot line work with Tips Tools is a big money saving proposition.

This new catalog will help you in the selection of the right tools for every job. It illustrates the simplicity and safety of Tips Tool designs. Send for your copy.

A·B·CHANCE CO. CENTRALIA MISSOURI

Thermocouples (834)

A 40-page catalog, described as the first complete publication on thermocouples issued by Leeds & Northrup Co., not only lists a comprehensive line of assemblies with their parts and accessories, but includes information of general usefulness on the correct choice of couples. Tabulated in easy-to-use form, this information should be helpful to users as a guide to the best choice of couple for the application at hand. Illustrations and listings are so arranged that parts and accessories, as well as complete assemblies, are easily identified.

Reclosing Relays (835)

Reclosing relays, hand reset, single enclosure are discussed in a 4-page bulletin recently issued by General Electric. It describes features of the Type HGA-13 unit for immediate initial reclosing of electrically operated breaker for use with a.c. and d.c. control circuits. Features and application are presented fully and construction outlined. Operation of these relays is given on the concluding page.

Fuse Puller (836)

A safe, easy to use, fuse puller is ably described in a new bulletin issued recently by the Pacific Electric Mfg. Corp. Made for cartridge-type fuses, this unit has a positive three-point grip with rubber-plated steel jaws, will take fuses from $\frac{1}{2}$ in. to 2 in. diameter. It is tested at 75 kv. per foot, and has a bronze hook for opening disconnecting switches.

Panelboards (837)

Nofuze panelboards that provide automatic protection for lighting and power circuits in homes, buildings, and industrial plants are illustrated and described in a new four-page variicolored folder by Westinghouse. Illustrated, with each component part pointed out, are three primary types of panelboards; one for lighting circuit protection, one for low capacity distribution, and one convertible lighting or power distribution board. A simple explanation of the "Bi-metal" principle of circuit protection, which eliminates fuses, is contained with clear-cut pictures and drawings to make easier the readers' understanding its operation.

Fluorescent Guide (838)

"Fluorescent Lighting," a practical guide to the application of Mazda F lamps and equipment, has just been published by the Westinghouse Lamp Division. The 23-page booklet explains how the lamps work and the whys and wherefores of auxiliaries. Answers are given for the many questions every lamp and lighting man is asked today about d-c operation, temperature effect in outdoor operation, color stroboscopic effect, radio interference, and lighting costs. Illustrations of installations, wiring diagrams, and tables of essential technical data are used throughout the book. Current-limiting devices, starters, lampholders, and other auxiliary apparatus are discussed in detail.

Kitchen Equipment (839)

Science Banishes the Dishpan!" is the name of Hotpoint's new visualizer for homemakers, containing provable facts and testimonials on Hotpoint electric kitchen sanitation equipment. This book compares old-fashioned dishwashing—both hand-washing and early automatic methods—with the perfection of the modern Hotpoint electric dishwasher and Calgonite, the scientific compound which conditions dishes to hygienic cleanliness. With a profusion of photographs, it shows how and why modern electric dishwashers and kitchen waste exits banish two of the most burdensome household tasks, and do it efficiently and economically.

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THE NEW PLATFORM STANDS FOR PERSONAL LIBERTY IN THE KITCHEN!

otpoint Presidential Campaign for Fall is predicted to be the Greatest Program in Hotpoint History

EDISON GENERAL ELECTRIC APPLIANCE COMPANY, INC., CHICAGO

Surfolets (840)

Chalk up More Profits say Porcelain Products, Inc., in a compact folder which discusses Surfolets, the company's newest development in surface wiring devices. Business building and profit making advantages are fully listed, and features of these units illustrated and outlined. Wiring diagrams are included on one page.

Tellurium Parkway Cable (841)

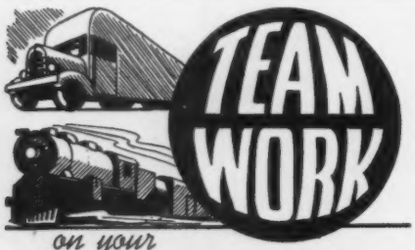
How to Terminate Tellurium parkway, shielded, single conductor cable and braided, shielded single-conductor cable is the subject of two G-E bulletins. Complete information is listed on each of these publications. Instructions follow in sequence, and every detail is carefully covered.

Outdoor Insulators (842)

A new 8-page leaflet, with price sheet attached, describing the complete line of outdoor apparatus insulators has just been issued by Westinghouse. These insulators are especially designed for supporting outdoor disconnect switches, bus structures, and other outdoor equipment. They are available in voltage ranges from 7.5 to 69 kv. Application information and construction features, including methods of attaching apparatus to the insulators, is discussed. To facilitate selection of the correct Westinghouse insulator for replacement of one of another make, a table of comparable catalog numbers of other manufacturers is given.

Lightning Arresters (843)

A new 8-page illustrated booklet listing and describing the recently announced additions to the line of type LV lightning arresters has just been issued by Westinghouse. Available in 8 voltage ratings, these arresters are designed especially for the small substation desiring reliable and economical protection. Tables showing performance values, and one giving application data, weights, and permissible line to ground voltage when used on different types of circuits, are part of the booklet. Dimensions are presented in sketch form for all eight arresters. Mounting methods are discussed, and the several available mounting brackets are fully dimensioned and described.



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LETTERS

Water-Heater Standardization

DEAR SIRS:

I have just read . . . with special attention your editorial on water heater standardization. As one of the manufacturers who has struggled along with the almost endless numbers of wattage combinations, we are particularly pleased at your editorial recognition of the efforts of our branch of the industry. Education and information, as in the columns of the various trade journals, will go a long way in helping to lick this problem. Concrete evidence of the value of the standardization program is in the fact that most new utility specifications are being written in line with these standards, and several companies have revised their old specifications to fit.

Our sincere thanks for your cooperation.

A. T. STRICKLER
Range & Water Heater Department
Westinghouse Elect. & Mfg. Co.
Mansfield, Ohio

Novel Contract Award

DEAR SIRS:

I have just come from a luncheon meeting sponsored by Mr. A. G. von Normann. Manager, Pacific Division of the Trumbull Electric Mfg. Co., at which I, as the representative of NECA, had the honor to act as master of ceremonies.

This meeting was called for the purpose of selecting an electrical contractor to do the wiring in the new building to be occupied by Trumbull Electric at 810 East Third St., and was attended by nine contractors and eight members of the Trumbull sales organization, including Mr. von Normann. At the conclusion of a most excellent luncheon, our host explained that the new wiring job would be let as a time and material contract and that the contractor would be selected by lot. He then handed me nine neatly wrapped packages, eight of which contained a gold pencil and one a gold pen, the contract to go to the one drawing the pen. I then distributed the packages and at the word "Go" each one was opened. Howard Stolper, Stolper Electric Co., Burbank, had the pen.

I wanted you to hear this story of industry cooperation and fair dealing on the part of one of our largest manufacturers. Here is one instance where all will profit. First of all, the customer will get a good job at a fair price, then the contractor will get a fair profit and the mechanics will get a fair wage. This will add to the general well-being of the entire community.

J. J. Newitt, Secretary,
Los Angeles Chapter,
National Electrical Contractors Assn.

More Operation Articles

DEAR SIRS:

It was with great pleasure and appreciation that I read in your July number the announcement that a series of short discussions about relays will appear in coming issues.

For the past three years I have been a PCEA member and a faithful reader of the ELECTRICAL WEST and as a power plant operator I have felt in your magazine the lack of simple and enlightening articles about the many apparatus or problems that the production part of the electrical industry may present.

In printing more of this type of article I believe your magazine will become even more interesting for that large group of men in charge of the operation and maintenance of generating plants, substations and transmission systems.

V. Marega,
Huntington Park, Calif.

Eliminate complications!

TELESCOPE BM SYSTEM

There's no extra turns or twists to make with B-M connectors and couplings. Just TWO SQUEEZES with the patented B-M indenter, and you have a smooth, efficient job.

YOU ALSO:

- Save 25% on materials.
- Save 25% to 50% on time.
- Make quick, easy installations.
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- Do no fussing with nuts to tighten.

Approved by Underwriter's Laboratories

$1.25 Buys the Tool for Speed + Accuracy For More Profit!

This one patented tool (½" B-M indenter) handles 80% of all installations. Pays for itself many times over on the very first job.

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"1 will get you 5"...

when it comes to rural lines

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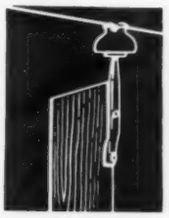
A single supply source is always the best bet on equipment that's installed to function as a unit. Ordering is simplified, deliveries co-ordinated and the things that work best together are recommended for the job.

What's more, when GRAYBAR is the supply source, you get experienced buying assistance from men who know "the whole picture." *One call brings them all* when the order goes to GRAYBAR.

POLES



National Western Red and Northern White Cedar Poles – Butt-treatment by Permex incising and impregnating method adds to the natural long life characteristics of these poles. *International Creosoted Pine Poles* – Clear straight poles, meeting high ASA standards, treated by a scientific creosoting process.

INSULATORS

Thomas "Quiet-Type" Porcelain Insulators feature patented under-glaze oxide coating which ends the problem of insulator radio noise effects. Long service life is assured by advanced thermal, electrical, mechanical characteristics. GRAYBAR offers complete line – check coupon for "Quiet-Type" Insulator Booklet.

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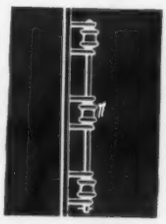
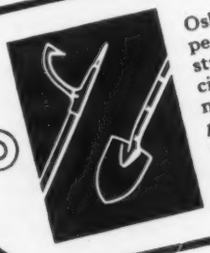
Among modern conductors for rural distribution service, Crapo HTC-130 sets a new high in providing a ferrous wire with maximum tensile strength and minimum electrical resistance. Available in both solid and 3-strand. Write GRAYBAR for folder on HTC-130 and other Crapo galvanized wire and strand.

HARDWARE



The complete Hubbard line of pole line hardware includes pole top pins, racks, wire holders, insulator bolts and devices specifically designed for low-cost rural lines. GRAYBAR specialists will help you choose approved items for every type of service combining security of performance and low-cost. Mail coupon for details.

TOOLS



Oshkosh shovels, spoons, diggers, peavies, pike poles and other construction tools are built by specialists in meeting utility field needs – offering the *lowest cost per unit of work*. GRAYBAR offers experienced aid in choosing construction and maintenance tools, linemen's safety equipment and supplies. Just mail coupon.

"1 will get you 5" . . . Mail coupon for information on any or all of these services.

EW8

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Gentlemen:

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2. Thomas "Quiet-Type" Insulators ☐
3. Crapo HTC-130 Steel Conductor ☐
4. Hubbard Pole Line Hardware ☐
5. Oshkosh Construction Tools ☐

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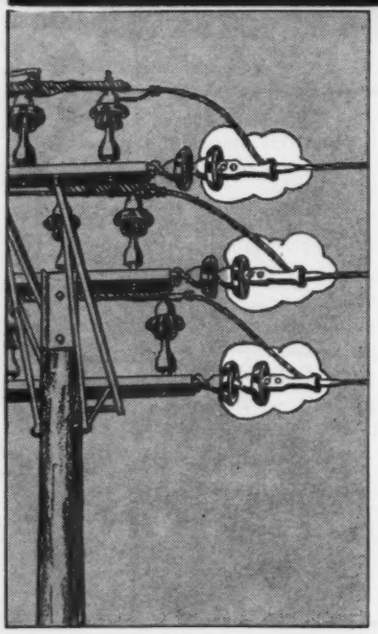

Primary dead ending with

Reliable Straight-Thru Dead Ends

• **RELIABLE STRAIGHT-THRU DEAD ENDS with rigid clevis make convenient, low cost and high strength connections to disc insulators. The end of the wire can be fed STRAIGHT-THRU the unit and used as a jumper. Hole in clevis enables the lineman to insert bolt for attaching rope blocks when pulling slack. The dead end has the same design features as the Reliable Straight-line Splice.**

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OVER 30 YEARS SERVICE TO THE UTILITIES
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SCANNING THE MAGAZINES

Distribution Costs

"Keeping Down Costs for Service Continuity" *Electrical World*, July 13, p. 50—This launches a series of articles which this magazine is presenting under the generic title "Programmed Distribution." Pointing out that perhaps 20% to 30% of a utility's entire investment is in equipment devoted primarily to service continuity, the author (W. J. Lyman, of Duquesne Light Co.) endeavors to lay the groundwork for mathematical comparison of outages against dollars.

Quick Figuring Bills

"Short-Cut Bill Calculation," *Electrical World*, July 13, p. 60—A summary of bill-estimating methods, of special interest to salesmen who wish to make quick computations and to rate and accounting departments. Mathematical elements are discussed briefly, and formulas are tabulated.

Motor Vehicles

"Planning Gets More Mileage From Fleet Dollars," *Electric Light & Power*, July, p. 38—Thorough analysis of a well-planned transportation program. How Kansas City Power & Light selects its types; what inspection and maintenance schedules are followed.

Finance and the SEC

"Eicher's Dissent," *Time*, July 15, p. 63—One column on SEC's decision with reference to Ogden Corp. (successor to Utilities Power & Light) which allowed substitution of a bank loan for preferred stock. Discussion of background principles and why Commissioner E. C. Eicher dissented.

Not Price

"Promotion, not Price, Begets Progress," by B. W. Bullock, *Electrical Merchandising*, July, p. 6—People don't want new things . . . not until someone has done an expensive job of education. Bullock is G-E appliance and merchandise dept. advertising manager.

Wrap It Up

"Selling Packaged Kitchens, by Clotilde Grunsky, *Electrical Merchandising*, July, p. 10. How the Howell Electric Co. of Reno, Nevada, found the answer to selling the complete job.

Table Cookery

"Portable Cooking," *Ladies Home Journal*, August, p. 32, 33—Some practical household hints on this subject, in which electric appliances and wiring are important to success.

On the Stand

"Fog, Fiction and Fact in the Construction Industry and the Anti-Trust Crusade," by Herman L. Neisman, counsel for the New York Electrical Contractors Assn.—*Qualified Contractor*, July, p. 12.

Small Wire

"This Means New Plus Business to You," *Wholesaler Salesman*, July, p. 14—an article on the sales opportunities inherent in new small diameter wires.

Warming Mother Earth

"Heating Hotbeds with Radiant Energy from Incandescent Lamps, by Robert L. Zahour, *Illuminating Engineer*, July—Covers methods, shows how electric heating units can be easily and quickly installed.

Preventing Voice Interference

"Co-ordination of Power and Communication Circuits for Low-Frequency Induction," *Electrical Engineering*, July, p. 403—Comprehensive reading for those directly concerned. Bibliography lists 52 references.

Home Modernization

"FHA Helps Building Industry," *Printer's Ink*, July 12, p. 21—Details of a nationwide campaign in cooperation with FHA patterned after last summer's successful drive built around the slogan, "Fix Up Your Home! Modernize." Available for local use will be suggested newspaper copy, store displays, car cards, direct mail and special radio programs.

ELECTRICAL TESTING LABORATORIES

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THE G. C. A. Manufacturing Co.
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NOW—lower prices and higher capacities

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JOHN A. ROEBLING'S SONS CO. OF CALIF.
San Francisco, Los Angeles, Seattle, Portland

IF IT'S ELECTRICAL WIRE OR CABLE **ROEBLING** HAS IT!

ELECTRA'S HUSBAND

Wendell L. Willkie

"WHAT a political prophet you turned out to be!" Electra jibed as it became evident that the masterfully stage-managed New Deal show at Chicago had drafted Roosevelt for a tradition-shattering third term attempt. "First you said Willkie couldn't get the Republican nomination, and then you insisted that FDR wouldn't accept the Democratic. Now turn off the radio before you get nervour indigestion worrying about the election—which won't be until November anyway."

"You know my dear, even prophets are sometimes swayed by their emotions," I mused, "I was frankly afraid the Republicans wouldn't have common sense enough to recognize a trend and an opportunity in the case of Mr. Willkie. And I was hopeful that Westbrook Pegler's Mr. Big would have courage enough to admit that social theories aren't the kind of armament America needs to meet the practical realities of this present crisis. Just two bum guesses."

Hoping that Electra would let the subject drop, I reached for the last copy of *Reader's Digest* just as a ruse, for I wanted to reflect upon the ability of radio, even without television, to portray a vivid and impressionistic picture. I wanted to contrast the just completed desultory and forced Chicago nominating ceremony with the spontaneous, tense drama that had been enacted in Philadelphia when the will of a great segment of the American people overrode the protests of a group of politicians. Radio had made both of these sessions live—even Electra had said that listening to that last night at Philadelphia had been more thrilling than any football broadcast. But my ruse failed; Electra wanted to talk.

"About this man Willkie," she said, "you people in the electrical business ought to feel proud that one of your kind won a presidential nomination."

"Certainly we're proud and why not? I countered. "But there is more to it than that. Wendell Willkie is a business man—a successful business man. It doesn't make any difference that he happens to be a utility man . . ."

"Doesn't it?" Electra interrupted. "I thought those kind of people were in the public doghouse. From some of the remarks made by the New Dealers, I've been expecting that Mr. Willkie would be given the smear."

"For what?" I said with a lot of feeling. "For successfully managing one of the largest utility enterprises in the world? For the low rates he has put into effect in his territory? For the way he has popularized electric service? For the fight he gave the TVA crowd? After all, honey, pretty nearly everything that can be said about the utility business and the people in it has been said. There aren't any new attacks that can be made. The Norrises, the Rankins and the Thompsons have just about run out of ammunition. And if I'm any judge of public opinion, the people don't give a damn about the so-called 'power issue' any more. Witness the outcome of some of the recent elections out here. And besides Mr. Willkie can take care of himself in that kind of a fight and the New Dealers know it."

"Yes, his pictures show that he's a fighter," she interjected. "And they show too that he's intensely human. He's the kind of a man one can trust. I wonder how it is that people were so taken with him in such a short time?"

"Maybe I can tell you," I replied. "Hank and I were talking about it today. We agreed that for a long time there has been an ever increasing yet latent public dissatisfaction with the way this country has been heading. People have been discontented with the growing public debt and the squandering of billions of taxes. They haven't liked the policy of defeatism that has been passed out as gospel. They have begun to mistrust those who have preached that business and industrial leadership has been no good. They were getting tired of the usurpation of their personal liberties and the building up of a monopolistic government. They've been sickened by the thought that an increasingly larger element of our people were forgetting the obligations and responsibilities that go with the privileges of American citizenship.

"Call this spirit that was building up anything you like—patriotism perhaps, or fervor—but I like to think of it as the same spirit that caused our forefathers to revolt against injustice and intolerance and that actuated the pioneers when they conquered this great West. Well, this spirit was crying for leadership; it wanted someone and something to make it vocal, active and vital. Wendell Willkie was the answer. He stood for the things these people wanted. He spoke a language they understood and appreciated. They suddenly discovered that they had a cause and a potential leader. From then on it was easy. The newspaper columnists saw it coming and helped the wave along. So did *Fortune*, *Time*, the *S.E.P.*, *Reader's Digest* and other magazines. But by and large it was an upsurge of popular sentiment."

"You even had your say if I remember rightly," Electra said jokingly. "But you've been talking about past history. What will happen between now and November?"

"Trying to make me prophesy again?" I asked. "I don't know what the outcome will be on the morning of November 6. But here's something I do know: If people like you and me and the millions of others who believe in the things Wendell Willkie stands for will go out and work and talk and convert our friends and associates, we'll exert a tremendous influence on the final result. Remember, it was people like that who won the nomination for him — rank amateurs the politicians called them."

"Well if the three Willkie petitions I had filled with signatures spoiled my amateur standing," Electra said, "I'm starting tomorrow as a professional."

ELECTRA learns some of the queerest things. For instance two California universities issue vocational guidance books for use of potential students in selecting courses to be studied. Under the subject of home economics no mention is made of job possibilities that exist with either gas or electric utilities. Maybe the people who prepare such information never hear of a power company home economist. Funny thing is that they should know about them. For a couple of years utility home economists have been giving instruction in home lighting and the use of electric appliances in these same universities. These are popular courses. Almost all of the home economics students take them—but not the people who write the books.

SPHEROLITE

....gives you <u>both</u> effective lighting and economical maintenance!

EASY TO DETACH Spherolite glassware for cleaning or replacement in the field. Spherolite's toggle latches are easy to open, make a positive seal when closed.

EASY TO RE-LAMP the Spherolite, especially when you specify this hinge and automatic latch. Also makes it easy to clean the reflector without removing the glassware.

EASY TO SERVICE inside the hood. Supporting chain prevents detached Spherolite reflectors from dropping down while wiring, cleaning, etc.

CONVERTIBLE . . . Radial bowl and other type reflectors easily latched to Spherolite hoods without adapters. Gives your system flexibility.

Effective lighting...increased visibility at decreased cost . . . that is the operating side of Spherolite efficiency. On the maintenance side, the Spherolite's design permits the time-saving, money-saving advantage of servicing in the field. You re-lamp the Spherolite, clean its reflector, replace or clean its glassware *in the field* . . . no need to remove and return the Spherolite to the factory for such minor servicing. Why not combine this effectiveness of lighting and economy of maintenance in your next street or highway installation . . . you're sure of *both* with Spherolites.

LINE MATERIAL CO. MILWAUKEE, WISCONSIN

SIMPLIFIED APPLICATION

ON HEAVY DUTY D. C. TRACTION SERVICE

WITH NATIONAL GRADE AX5 BRUSHES

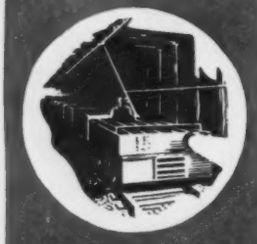
TRADE-MARK

FOR MORE THAN TEN YEARS

THE OUTSTANDING D. C. TRACTION BRUSH

on High Speed, Heavy Duty Service

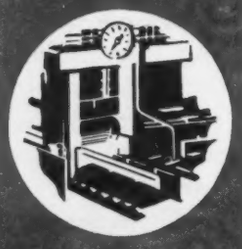
"National" Grade AX5 brushes have demonstrated their capacity to give dependable performance at low maintenance cost. This simplifies the problem of brush application on high speed, heavy duty traction equipment. *Simply choose "National" Grade AX5.*



SPECIFY GRADE AX5 FOR

High Speed Electric Trains
Terminal Electrification Equipment
Multiple-Unit Suburban Trains
Gas-Electric Rail Cars
Diesel-Electric Streamliners
Diesel-Electric Switching Locomotives
Modern Street Railway Cars
Trolley Coaches
Gas Electric Buses

To offset the effects of vibration specify **RUBBER PRESSURE PADS** on holder end of brushes.



UNIT OF UNION CARBIDE AND CARBON CORPORATION

GENERAL OFFICES
30 East 42nd Street
New York, N. Y.

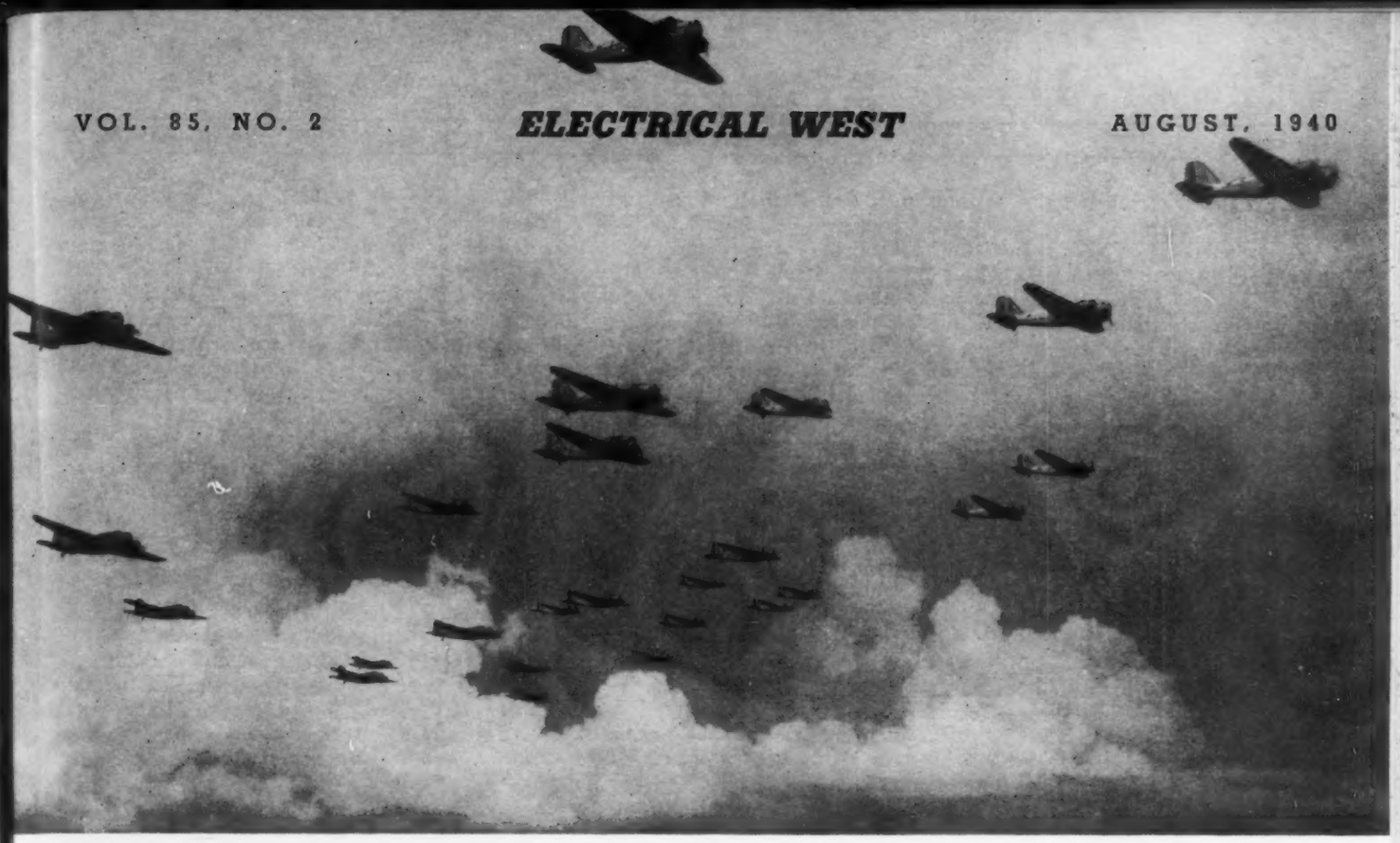
UCC

NATIONAL CARBON COMPANY, INC.

CARBON SALES DIVISION . . CLEVELAND, OHIO

BRANCH SALES OFFICES
NEW YORK
PITTSBURGH
CHICAGO
ST. LOUIS
SAN FRANCISCO

VOL. 85, NO. 2 ELECTRICAL WEST AUGUST, 1940



Official Photo, U. S. Army Air Corps.

National Defense

AMERICA has taken a momentous step. Cataclysmic events of the last ninety days have left the nation no other choice. Today the United States is engaged in the tremendous task of arming itself so completely that no possible combination of dictatorships would dare to attack it. Irrespective of the outcome of World War II, our nation must be equipped with the naval and military implements of modern warfare to such a degree that we will be universally recognized as the number one world power. No matter how distasteful or expensive this course may be; no matter how great the sacrifices—and they will be great—we have no other choice. The stakes are too great—our liberty, our democratic ideals and principles, perhaps our very lives are in the balance.

This program of preparedness for national defense will require the judicious and efficient use of all of our industrial resources. Why? Because wars are now fought by industry as much as by the Army and Navy. Before manpower can be mobilized, industry must supply the implements of warfare. Mechanized warfare as demonstrated by the lightning drives in Europe, makes our defense program primarily an industrial undertaking. It is absolutely essential therefore, that industry be maintained on an efficient basis despite any stress of present or future emergency.

Herein lies a definite responsibility of the electrical industry. Industrial production today is largely an electrified process. Here in the West practically all of the power used by industry comes from the lines of the utiilty systems. This power supply must be adequate, it must be reliable and it must be capable of meeting future requirements. The utility industry in the West can meet all of those conditions. At the beginning of 1940 there were 649 generating plants in the 11 Western states with a total installed capacity of 6,378,619 kw. It is conservatively estimated that this capacity included a reserve sufficient to handle peak loads 50 per cent greater than those imposed last year. As additional insurance that the supply will be adequate, some 1,108,500 kw. of new capacity is being installed on schedules ranging into 1942. Of this amount 152,500 kw. will be available before the end of this year, and approximately 500,000 kw. in both 1941 and 1942. Should emergency requirements be such that some of this capacity is needed earlier, it would be possible to speed up the schedules.

Moreover the fact that the utility systems in this area are interconnected so as to assure reliability of supply, economical operations, unification and realization of the benefits of diversity is another highly important factor in national defense. Here again, if the present interconnections prove inadequate, it will be a simple matter to reinforce them. Back of these physical facilities is a trained and alert personnel.

Thus there can be no question about the ability of the electric power industry here in the West to shoulder any and all loads and to meet any responsibilities imposed on it. It can and will be a major factor in the national defense program. As demands are made upon the industry it will be found that the response will involve more than mere physical facilities. Organization, plans, properties and methods of thinking will be mobilized and energized to meet any emergency.

Compensation on the Schoss-Read Plan

Ogden, Utah firm urges salesmen to best efforts with generous commissions, based on contract agreement

TO the salesman nothing is quite so important as how he is paid, whether it is acknowledged or not. Fred Schoss, of Ogden, believes that nothing is quite so important as the way in which the dealer pays his salesmen.

With this mutuality of interest one would think the problem would have been solved long ago, but oddly enough, it is far from solved in most retail establishments. Perhaps, modestly—or maybe just cautiously—admits Schoss, his is not the ultimate solution. But at least his plan of operation has in it now the fruits of many, many years of trial and error; experience, not theory. The most surprising part of the Schoss-Read Electric Co. plan is that the more a salesman sells, the higher his percentage and income. In so many compensation plans just the reverse is true, as if to limit a good man to making less than the boss does, even if he does a whale of a business for him.

Thus the Schoss-Read schedule puts all the incentive at the top and the salesmen try their utmost to stay up as high on the scale as possible every month. The better they do the more they make—in percentage and in salary, both. A salesman who does $5,000 of sales in a month can earn as much as $700 that month, only $150 of which is salary.

Detailed schedule of compensation of the company is shown in the accompanying table. It will be noted that the percentage on sales is "less trade-in," which in itself discourages the salesman from giving too liberally on trade-ins.

Many years of sales experience are packed into that unusual schedule. Fred Schoss was the first Maytag dealer in the West, and in 1923 was distributor, too. Since 1929 he has been a dealer only, preferring to limit his scope to his home community, where he runs a substantial and successful business. One branch in Tremonton, Utah, is the limit of his present expansion. So there is built into this compensation plan of his the wisdom gained by handling salesmen for years, of knowing what keeps them alert and satisfied, of holding the good men by making it worth their while.

Sales staff now consists of seven men, two of whom have been with the firm 16 years; the newest man three years. There is very little turnover, in other words. There are four departments to the store, with one man in charge of each, the top man in the department. Salesmen also help each other to put over a sale or to meet bogey. Each department helps others.

To take care of this, the sales plan contains a 2 per cent commission paid to the salesman closing the sale and paid by the salesman who has worked with the prospect actively but who may not be in the store at the time the deal is closed.

Another provision of the salesman's contract calls for a $1,000 fidelity bond and a revert fund of $100 per salesman. This fund is set up for each salesman from deferred money due him on time accounts, at the rate of 2 per cent until a total of $100 is being held. Where an appliance is repossessed when 30 per cent has been paid in there is no charge made against his revert fund; when 20 per cent in cash, one-fourth of the percentage is charged back against the fund; when 15 per cent, one-half is charged; when 10 per cent, the full percentage.

Fred Schoss, manager of Schoss-Read Electric Co., Ogden, who believes in paying salesmen more for bigger sales

Schoss believes in sales meetings. In fact a short sales meeting is held each morning. Once a year, at New Years, a full employees' meeting is held and each man writes resolutions as to what he aims to do that year.

Another thing that has proved its worth both to the salesmen and company is the daily record kept by the salesman and summarized by the company. With the salesman's name, the report carries a list of the prospects' names and addresses, the articles worked on, whether demonstrated or not, a note as to when it can be expected to be bought. Notation is made of whether a trade-in is involved; whether it was a store lead, outside call lead, or lead from a former customer. Sales for the day are entered and activity for the day explained—where worked, new calls, follow-ups. A record is also made of the merchandise charged to him or which is out on demonstration.

These reports are transferred by the office to a master sheet and followed up by the manager. Especially does he watch for call-backs on old prospects. Every six months or so the record is checked on such prospects and if a special inducement can be offered, this is used to reopen the sale.

Between the compensation incentive to hold down trade-ins and a good service department Schoss-Read makes money on trade-in merchandise. The service end of the business Schoss considers one of the most vital in the business.

Complete electric kitchens are the kind of sales that jump a Schoss-Read salesman up into the money quickly, and every salesman is doing his utmost to sell them. There is real incentive to do so, rather than to take the line of least resistance and sell merely a refrigerator or washer. Hence this company is making many complete kitchen sales. One of the more recent ones was pictured on the front cover of ELECTRICAL WEST in July, 1940. It was a kitchen sold to Mrs. J. M. Silver, of Ogden, the first home built in that city with steel joists and roof trusses. Nat-

SCHOSS-READ ELECTRIC COMPANY
NEW COMMISSION SCHEDULE FOR FULL TIME SALESMEN
AS PER CONTRACT AGREEMENT
THIS SCHEDULE IS EFFECTIVE FEB. 1, 1940
SALARY AND COMMISSION AS FOLLOWS

Sales	Set-up on Sales	Per Cent on Sales Less Trade-in	Total Earnings
$ 250.00	$ 25.00	3 %	$ 32.50
500.00	35.00	5 %	60.00
750.00	50.00	5½%	91.25
1000.00	65.00	6 %	125.00
1250.00	75.00	6½%	156.25
1500.00	85.00	7 %	190.00
1750.00	95.00	7½%	226.25
2000.00	100.00	8 %	260.00
2500.00	110.00	8½%	322.50
3000.00	120.00	9 %	390.00
3500.00	125.00	9½%	457.50
4000.00	135.00	10 %	535.00
4500.00	140.00	10½%	617.50
5000.00	150.00	11 %	700.00

EXTRA SPECIAL YEARLY BONUS

If the sales figure is over on any of the above amounts, and not up to the next figure, then the salary figure used will be on the next lowest sales amount, and the percent will be figured on the next highest sales amount.

This plan is based upon regular prices furnished to salesmen or as per price tag on merchandise. Commission and set-up will be paid twice monthly, on the first and fifteenth of each month. Closing of sales for the month, midnight of the last day in each month.

$1,000 per month—if $12,000.00 made during calendar year ½% bonus on sales—$ 60.00.
$1,500 per month—if $18,000.00 made during calendar year ¾% bonus on sales—$135.00.
$2,000 per month—if $24,000.00 made during calendar year 1% bonus on sales—$240.00.

If salesmen leave sales force before the close of any calendar year, the special bonus plan is void.

urally the steel cabinets of an electric kitchen were appropriate to such a home, and modern electric appliances for the kitchen.

Questionnaire

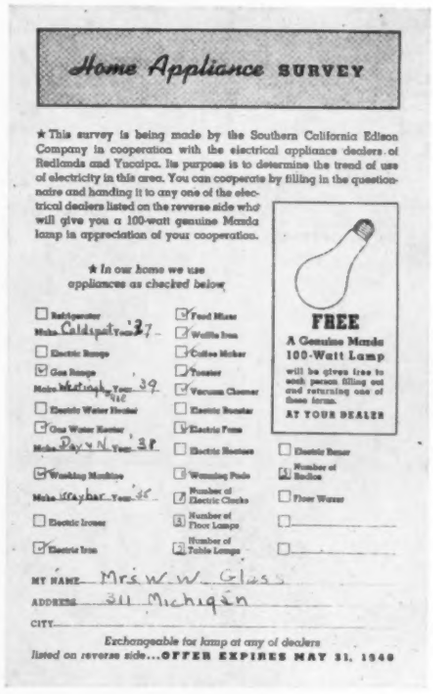
Appliance saturation sampling undertaken by So. Calif. Edison

An appliance saturation sampling procedure which adds loads, provides an inventory of equipment in the home, increases dealer floor traffic and assures dealers of an up-to-date prospect list has been worked out by the Southern California Edison Co., according to H. C. Rice, manager of domestic sales. Technique employed in accomplishing these diverse purposes involves a simple questionnaire which incorporates a free offer.

Enclosed with monthly bills, the questionnaire states that when properly filled out it will be redeemed for a free 100-watt Maxda lamp by any one of a number of cooperating dealers whose names are printed on the reverse side. There are no strings attached; the customer simply fills in the information requested and takes it to a dealer's store.

Dealers are provided with prospect cards on which the information may be transcribed along with any other pertinent facts obtained at the time the questionnaire is redeemed. Finally the questionnaires are picked up by Edison dealer contact men and the dealer is re-imbursed the full list price of each lamp given away. Data on the cards are tabulated by the company.

The plan is being applied on a rotating basis in the various Edison districts. To date questionnaires have been mailed in the Santa Barbara and San Bernardino districts. Returns average slightly better than 10 per cent. Dealers are enthusiastic over the program since it brings people into their stores and at the same time gives them accurate data on appliances in use. As one dealer says, "I should be paying you for this prospect information, instead of you giving me 15 cents."



Home Appliance SURVEY

★ This survey is being made by the Southern California Edison Company in cooperation with the electrical appliance dealers of Redlands and Yucaipa. Its purpose is to determine the trend of use of electricity in this area. You can cooperate by filling in the questionnaire and handing it to any one of the electrical dealers listed on the reverse side who will give you a 100-watt genuine Maxda lamp in appreciation of your cooperation.

★ In our home we use appliances as checked below

FREE
A Genuine Maxda 100-Watt Lamp
will be given free to each person filling out and returning one of these forms.
AT YOUR DEALER

MY NAME Mrs W. W. Glass
ADDRESS 311 Michigan
CITY

Exchangeable for lamp at any of dealers listed on reverse side...OFFER EXPIRES MAY 31, 1940

Eight-Ball

Hotpoint campaign puts every salesman behind the black oval

Taking advantage of rapidly growing trend toward "selling up" to larger capacity refrigerators, F. B. Williams, manager, Hotpoint Refrigeration Division, declared that the Hotpoint "8-Ball Campaign" will continue for eight weeks, concentrating exclusively on 8 cu. ft. Hotpoint refrigerators.

Williams said, "Consumers are becoming increasingly aware of the need for larger refrigerators, to efficiently care for average requirements. Those who own obsolete refrigerators have learned from experience. National women's magazines stress this point in all articles on refrigeration. The widening rural market opens still another field for large-capacity refrigerators. However, people *buy* what they can *see*. Only those dealers who have 8 cu. ft. refrigerators on display are in position to demonstrate their greater convenience and reap the greater profit. Hotpoint's 8-Ball Campaign will help place at least one 8 cu. ft. refrigerator on every Hotpoint dealer's floor, and insure his thorough understanding of the advantages of 8 cu. ft. refrigerator selling."

Prepared for the Hotpoint Refrigeration Division by Clinton Brown, Hotpoint campaign manager, this campaign puts every Hotpoint distributor salesman "behind the Eight-Ball," until he makes his quota. A special bonus will be paid to the salesman by Hotpoint and duplicated by the distributor, for every 8 cu. ft. Hotpoint refrigerator sold during the campaign. During the campaign, Hotpoint will offer dealers a specially priced sales promotion package to help them go after this business.

Bendix Derby

Bendix Home Appliances, Inc., is holding a "Hobby Derby" over the nation during July 10-September 14, for its salesmen, offering as prizes home laundries, vacation trips and 16 Studebaker Champions. For the purpose of the contest, the nation has been divided into 16 contest zones, based on normal sales of Bendix home laundries. Competition is only among entries in each contest zone.

In addition, the company is conducting concurrently a contest for customers in each contest zone, offering liberal prizes for the best statement on "Why I Bought My Bendix Home Laundry."

Evaporative Coolers

Edison builds real business on well planned campaign

Man's eternal search for comfort has created a new industry, in the opinion of Henry C. Rice, merchandise manager, Southern California Edison Co., Ltd., as he explained the evaporative cooler program which is making even greater sales progress this year than last. With a special training program as the feature of this year's campaign, the sale of evaporative coolers is reaching proportions similar to those of the refrigerator market of a few years ago.

The evaporative cooler business on a campaign basis was first initiated last year when a four-months campaign was decided upon between the manufacturers and the Edison company. Last year a financing plan was worked out on a graduated scale with a large down payment and decreasing payments during the cooling season in order to protect dealers making the sales. This was tried in three divisions—in San Joaquin, the Antelope Valley and the San Bernardino. It was supported by direct mail and an advertising program. It was successful in the San Joaquin and Antelope valleys but not quite so in the San Bernardino region. However, over 600 units were sold. This year a new plan was tried. Financing was not considered a necessary part of the plan. The weak link was said to be salesmanship and organization. Therefore, a training course for dealers and dealer-salesmen was proposed, with the industry providing the faculty.

The sales training meetings were arranged for in those divisions in which it was felt the need was greatest. This included the San Bernardino, Pomona and Pasadena districts. Under the George Dean Act the Junior College furnished facilities and a leader and the program was set up. Letters were sent to all dealers inviting them to a preliminary meeting to discuss the need for evaporative coolers to learn of the market, the profit possibilities, hear an outline of advertising and promotion, and discuss the instruction course to be given.

At San Bernardino, 71 enrolled and the average attendance for the four meetings in the course was 60. In Pomona representing a smaller area, 36 out of the 42 total dealers attended and the average attendance for the course was 24, in spite of conflicting attractions. Enrollment at Pasadena was 105.

The preliminary meeting program consisted of a talk by H. H. Douglas, engineer of Southern California Edison Co. on "The Need for Comfort Cooling"; a talk by Henry Sachs, chief engineer Utility Fan Corp. on "Evaporative Coolers—What They Will Do"; H. S. Mulhollen, Essick Machinery Co., on "Profit Possibilities" and Mr. Rice talked on "The Market and Edison Co.'s Advertising and Promotional Plan."

I'LL BE GLAD WHEN WE DON'T HAVE TO POUR THE BUTTER
EAT COOL IN HOT WEATHER
GET AN ELECTRIC EVAPORATIVE COOLER
AH... THIS IS BETTER!
FOR HOME, OFFICE OR SHOP
SEE YOUR DEALER TODAY

Type of advertisement run by Southern California Edison Co. in conjunction with promotion which tied in with cooler manufacturers, established salesmen training schools, and sold comfort cooling on a large scale

Under the George Dean Act, Mr. Juett representing the State Board of Education presented the course to cover the following subjects: (1) fundamental principles of evaporative coolers; (2) application of coolers, (a) where, (b) when, (c) how; (3) installation methods; (4) servicing policies; (5) sales plans, (a) obtaining prospects—where and how to find, (b) sales demonstrations, (c) terms of sales, (d) guarantee.

In analyzing the market, Rice pointed out that in a typical community such as San Bernardino or Pomona where there are 82,264 domestic customers, in the whole area there reside 320,000 people. Of these it is estimated that 10 per cent are allergic to dust and pollen and get relief from any washing device which removes some of the dust and pollen from the air as well as provides a cooling effect. Thus, 32,000 people can get physical relief from use of comfort cooling. Of these, 8,000 may be considered prospects if they can be found. Yet the story of this relief travels between victims and stimulates the market. Of that population, 40,000 can well afford to pay for "comfort cooling." He cautioned not to call it air conditioning. With an average selling price of about $100 for a good unit, this makes a market of $4,000,000 which, in his opinion, is as much of a market as when refrigeration first started. He pointed out that there is no reason for chiseling or cutting each other's throats and that the idea was to provide an engineering service with it and make the business a respectable one.

Inland Empire Sales

Percentages climb over '39 figures as half-year mark is reached

Sales for 1940 to date show outstanding accomplishment, according to figures compiled for the Inland Empire Electrical Equipment Association, Spokane. Sales of water heaters have soared over last year, with five months to date showing a 149 per cent increase over the same period in 1939. The month of May in 1940 showed a 146 per cent increase over May, 1939. Range sales climbed 63 per cent for the first five months in 1940 over the same period in 1939, while the month of May, 1940, showed range sales up 93 per cent.

Refrigerator sales show an increase of 32 per cent for the year to date over the same period in 1939; stokers are up 59 per cent; oil burners 134 per cent; home air conditioning units, up 220 per cent; and home ventilating systems up 108 per cent. Other increases are table cookery, up 11 per cent; roaster sales up 9 per cent; other motor devices, 33 per cent; farm devices, up 141 per cent. Total sales, not including lamp bulbs, are up 14 per cent for the first five months, with lamp bulbs up 8%.

A SORRY SITUATION—the boss has lost his clothes. Only the diligent efforts of Lewis A. Lewis's salesmen in the Washington Water Power Co. enabled him to walk the streets again in full raiment. Unique campaign continues through the month of August

G-E. Retail League

Company has instituted 39 chapters in western states

THIRTY-NINE retail chapters have been organized in the 11 western states under the national program of the General Electric Co. Retail Development League according to J. De Jen, president.

In Washington there are five chapters, in Oregon five, in California fifteen, Idaho three, Montana four, Wyoming one, Utah two, Arizona one, Colorado two, New Mexico one and in Nevada none so far.

The first year's program of the League has reached its halfway mark and begins the fall season of meetings in September. The travelling sales training presentations sent out from General Electric have formed the principal activity of the League chapter meetings. Planned seasonably to give sales training on the appliances pertinent to each season, the presentation is dramatized and the sales training made easy to take.

All the paraphernalia of a lodge has been worked into the orgagnization. Certain ritual is part of the meeting procedure and everything is done to give the organization an exclusiveness and class that makes it desirable to belong.

Purpose behind the League is to help the retail dealer carry a large part of the sales training cost that is recognized as necessary to modern selling in competitive markets. Changes in the distribution picture have been hard on the specialty organization. According to De Jen "The transition of strictly specialty items to partial traffic items has been largely responsible for this decline in creative technique, but dishwashers, disposals, water heaters, ranges, kitchens, and ironers are still wholly in the specialty class. The specialty salesman, with selling motives and income reduced, has become the forgotten man. The full responsibility for hiring and training salesmen has been passed on to the retailer. The retailer needs leadership and his salesmen need a champion. We are attempting to set up the machinery to do the job."

Jack Poteat of General Electric presents the gavel to chapter president Gray Minor of the Oakland Retail Development League at ritualistic ceremonies characteristic of this sales training organization. At the present time there are fifteen such chapters located in California alone

Dripmeter

Device invented by WWP man helps water heater service

Lo, the poor dripmeter! A sad-sounding little word, true, but upon its use hinges greater efficiency of electric water heating service. The dripmeter, a testing device, was designed by Harold Doty, supervisor of water heating installations with The Washington Water Power Co., and indicates the loss of energy caused by the frequent drip-waste of hot water.

Adoption of the testing device followed the utility's recent rate reduction in April, when thousands of customers changed from the flat rate water heating service to the single-meter rate. It was agreed by the company that to insure maximum satisfaction with its customers, and thus compete with the cheap power promised by political promotion, a rounded program should be launched that would make water heating exactly what the customer wanted. One of these improvements had to do with the insulating of all hot water pipes in the customer's home. Another improvement included educational steps designed to assist the customer in making rational use of the service.

To further this effort, it became evident that some unusual means was necessary to convince the customer of the importance of losing hot water through dripping at the faucet, and the dripmeter evolved as a successful visual indicator.

Doty came to the conclusion that the conventional method of counting the number of drops of water flowing from the faucet per minute was inadequate

HAROLD DOTY

because no allowance was made for the size of the drop of water. Drops not only varied, according to tests, from the same faucet, but varied for different faucets. It as found that the thicker the lip of the faucet, the larger the drop of water. In the process of making tests on the varying size in drops, Mr. Doty conceived the idea to put a scale on a test tube, calibrated to show gallons of water loss per day. This invention, termed the dripmeter, accurately measures the amount of hot water lost from a dripping faucet in that a unit of measurable quantity per unit of time is found rather than depending upon a quantity of variable size. As calibrated, loss in gallons each 24 hours is indicated by holding the tube under the dripping faucet for 30 seconds.

Tests and research have reaffirmed the high degree of accuracy of the dripmeter, and its success is indicated by the fact that 80 such meters are being used throughout the territory of the company. Readings may be made by a salesman or the customer.

● TULL AND GIBBS, Spokane, recently placed first among 20 West coast distributors in Philco refrigerator sales against quota for the 11 Western states.

MKB Plans

Modern Kitchen Bureau fall promotion gets under way

Fall program for electric ranges and electric water heaters has been completed by the Modern Kitchen Bureau, and will soon be launched into the field with the spring campaign theme on ranges remaining the same—"Fast as fire without the flame," and "Clean and cheap like electric light." The promotion itself, however, will be entirely different, being built around "Alice in Electric Wonderland."

National advertising will be used and window displays and counter cards in full color. An "Alice in Wonderland" show will be produced for electric leagues, local bureaus and for utility use.

The Donald Duck theme will also be continued in the water heater campaign. A complete new assortment of Donald Duck material will be available, with folders, national magazine advertising, window display contests, direct mail and radio spots being used.

Electric refrigerator, roaster and all-electric kitchen campaigns are also ready for dealers as the Modern Kitchen Bureau goes into the biggest promotional series in its history.

Campaigns

British Columbia Electric Railway Co., Ltd.—No campaigns scheduled for August, with fall campaigns set for September on electric ranges and refrigerators. Annual employee lamp globe campaign also set for that month. Company display is on view at Canada Pacific Exhibition from Aug. 26-Sept. 2, including separate rural electric display.

Idaho Power Co.—Current drive on electric cooking and water heating will prevail through August. Beginning in September, an eight weeks all-employee campaign on light bulbs. This is the 15th year in which this activity has been conducted. Also in September will start a four months promotion on better lighting, which will be primarily Idaho Power Co. promotion. Company and dealer activity will be coordinated in a special campaign on electric water heating and cooking. The company will participate with exhibits and demonstrations in the usual fall fairs held throughout the territory.

San Diego County Bureau of Radio & Electrical Appliances — "Nice Going America" campaign continued through July in series of refrigeration advertisements which appeared in local newspapers and on street car cards. Free refrigeration recipe booklets were distributed. Spring and Summer Radio Logs were still in demand. More than 20,000 being distributed.

Utah Power & Light Co. and the Western Colorado Power Co.—Lamp bulbs, IES lamps, fixtures and stoker campaigns set for September and October.

Pacific Power Co.—During July, advertising was focussed on electric refrigeration. July dealer bulletin Dollars to Dealers contained announcement of winners of the electric range essay contest in which 32 dealers awarded merchandise as prizes with cost reimbursed to them by the company.

● THE THIRD WEST COAST SALES Conference of the Trumbull Electric Mfg. Co. was held in San Francisco June 17-19, and was attended by the managers and sales organizations of the three West Coast plants of the company and also by Robert C. Graves, director of sales of its Plainville headquarters. Graves made a complete swing of the country by plane, stopping off a few days in Seattle and San Francisco.

APPLIANCE SALES REPORT, 1940

A Summary of Dealer and Utility Reports Compiled by Associations, Societies, Bureaus, or Dealer Contact Departments of Utilities

REPORTING COMPANIES	Idaho Power Co.[1]		Northwestern Elec. Co.[2]		Montana Power Co.[3]	P. G. & E. Co.[4]		Pacific Power & Light Co.	San Diego Cons G. & E. Corp.[5]		Southern Calif. Edison Co., Ltd.[6]		Utah Power & Lt. Co.[7]		Wash. Water Power Co.	
	1940	1939	Curr.	6 Mos.		Curr.	5 Mos.		1940	1939	1940	1939	Curr.	5 Mos.	Curr.	Mos.
Ranges	2,186	1,810		691		522	2,112		225	210	854	1,055	435	1,370		
Water Heaters	808	870		401		302	1,342		205	170	289	391	104	376		
Air Heaters, aux.						69	2,357									
Air Heaters, 220						97	704									
Refrigerators	5,249	2,805		2,375		10,305	33,892		4,575	2,875	23,885	18,646	1,643	5,029		
Dishwashers	12	10				20	109									
Washers	2,282	2,469		843		3,587	16,015		2,150	1,800	13,737	12,709	755	3,784		
Ironers	158	214				613	2,401		350	270	1,791	1,563	34	298		
Vacuum Cleaners	972	843		694		2,680	14,566		1,300	1,265	5,047	6,713	718	2,245		
Radios	5,216	3,701		2,406		11,303	54,338		5,375	4,400	31,420	25,078	978	6,880		
Mixers	417	336				406	1,891		500	450	1,450	1,440	112	630		
Cookers, Casseroles	179	160							295	260	172	202	11	71		
Irons	3,478	2,637							2,225	1,925	5,546	6,150	944	3,991		
Waffle Irons	851	680							575	800	1,861	1,921	254	1,518		
Toasters	1,562	1,168							1,750	1,525	2,661	2,855	254	1,729		
Table Stoves	2,045	1,295		3,211					500	345	1,047	1,195	302	974		
Heating Pads	508	455							615	735	922	1,011	69	1,341		
Curling Irons											165	254	48	448		
Coffee Makers	1,521	1,148							2,125	1,575	1,433	1,587	89	634		
Sewing Machines						571	2,631		565	595			75	659		
Clocks	980	751							2,125	1,550	2,637	2,757	229	1,188		
Fans	1,058	272		6.63							858	821	25	60		
Floor Polishers																
Sun Lamps	165	135									158	247	4	40		
Reflector Lamps																
Misc. Lamps																
Shavers											1,115	1,240				
Yard Lights													53	235		

SOURCES

[1] Figures compiled by Electric Equipment Sales Association. Include power company sales of all reporting dealers for 3 months.

[2] Lists appliances sold by dealers in Portland area. Figures compiled by Northwestern Electric Company.

[3] Combined dealer and company sales from report of Montana Power Co.

[4] Figures are being consolidated with San Joaquin Power and are not available this month.

[5] Gathered by Bureau of Radio and Electric Appliances of San Diego County. Estimated monthly sales figures used in this table: Miscellaneous figures include fans, curling irons and sun lamps.

[6] Includes reports from dealers on San Joaquin Valley system of company as well as Southern California areas served.

[7] Includes Utah Power & Light Company territory in Utah, Idaho and Wyoming. Also Western Colorado Power Company territory.

PRINT IN BINDING

ELECTRICAL WEST SALES GUIDE

OH SAY CAN YOU SEE

Even our National Anthem, sung a great deal these days, calls attention to seeing. Nearly everything that's happening these days emphasizes sight and makes a receptive atmosphere in which to sell more lighting equipment for the home. The "black-outs" over there emphasizes by contrast the wealth of light we may still enjoy over here. Magazines and newspapers recognize seeing when they turn more of their pages over to pictures instead of words. Never has the public been so sight-conscious.

With this to help you the fall lighting season opens. It is your cue to provide better **seeing** with your IES better lamps. Five million IES lamps have blazed the way to public acceptance. A wider variety of styles and models is yours to offer than ever. Manufacturers and utilities all over the land are advertising the IES lamp and Better Light for Better Sight. This awakens that market of yours in your own community.

Sell the IES lamp because with it you have something to sell up. It has public acceptance, people want more light, and better merchandise offers you full profit with each sale.

I.E.S. LAMPS

AUGUST
1940

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OH, BY THE WAY—

When the sale bogs down because of--

1. STYLE

2. UNCERTAINTY

the two major hindrances to lamp sales just now

1. STYLE is one of those things. Some like their lamps fancy, some plain. And they like them whatever way they like them—violently. They may even forget that the purpose of a lamp first is to give light to see by. When you know your clientele you buy the kind most of them want—fancy or plain. Once in awhile someone of the other kind wants a style that you do not have in stock.

Watch your step carefully. Taste is a matter of personal pride and to question it or belittle it may make an enemy. If a person has a personal preference she'll defend it to the last. So be tactful. Ask questions to ascertain exactly what she likes and wants. Find out where she wants to use the lamp and in what kind of furnishings. If she finds you sympathetic to her views then you can go on to prove that you have or can obtain an IES lamp that will satisfy her.

To do that, first bring her to recognize the real need, the real purpose of the lamp — **seeing.** Say something like this:

"I'm sure now that I know pretty much what you want and we'll look in the catalogs in a moment to see if we can find it exactly. But before we do that have you thought of the new lamp in terms of comfortable seeing? Let me explain what I mean. . . ."

Then, in your own words, tell her some of the benefits of real lighting (on the next page, in small type.)

SUGGESTED BY

2. UNCERTAINTY these days is natural and to be expected. But there's no need to accept it and get the blues too. When you sell IES lamps you sell cheer and comfort and peaceful home surroundings. You are merchandising one of the most needed commodities. So when you run into a prospect who doesn't want to buy just now because of uncertainty of the future, proceed like this:

"Can't blame you for that feeling of uncertainty. It's something that comes to all of us. But all the more need these times for cheer and light and happy surroundings. All the more need to protect the health and eyes.

"When you buy an IES lamp, this is really what it means—

"Protect the most precious sense you have—sight. Loss of its efficiency requires professional attention, takes away the joy of life, sometimes causes headaches and nervousness from eyestrain.

"Close eye work, such as study, reading, sewing—make that easier for yourself. Good lighting speeds up the ability to see and to do things accurately.

"Do your children squirm as they read? They may be trying to avoid glare or shadows. Good lighting promotes a healthy posture. It's comfortable to read in a natural sitting posture with good light.

"A safer home where there's good lighting; no tripping over half-seen objects.

"A more colorful, cheerful home with all the colors in your decorations seen at their best. Dresses and furnishings selected under excellent light in the store will look the same at home.

"Appearance of you and your guests under softened, well distributed light is flattering. Harsh shadows and gloom make folks look older; they frown more.

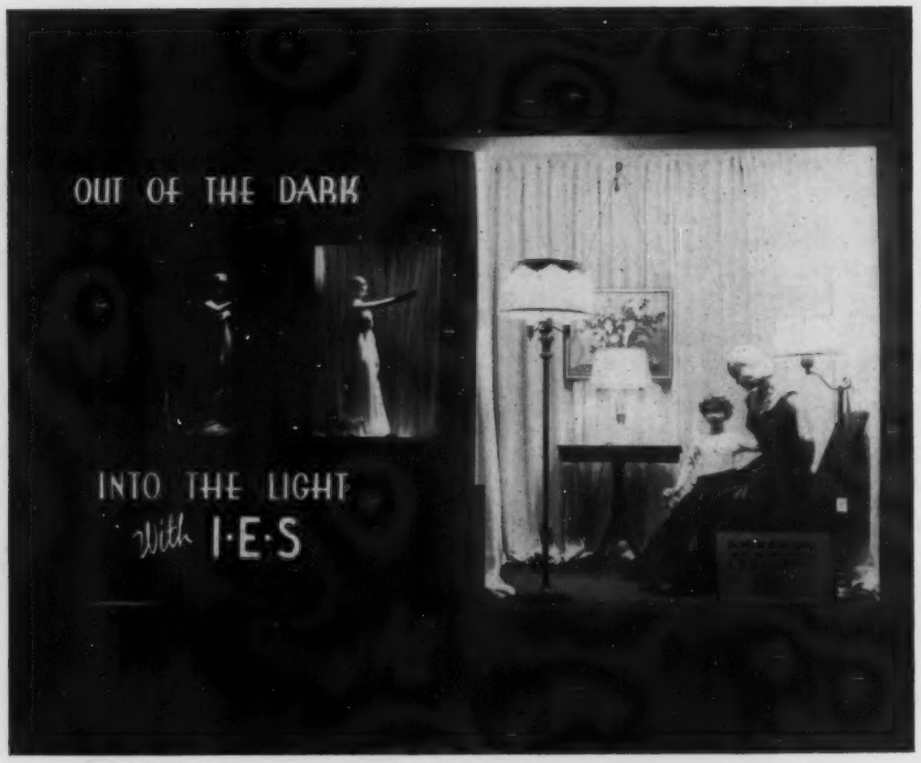
"More life where there's light. Light peps up a place. It relaxes the nerves where there's no strain to see nor glare to avoid. More sociable and carefree, just what's needed these days."

YOUR SALES ALLIES

PUGET SOUND POWER & LIGHT CO. . WASHINGTON WATER POWER CO. . PORTLAND GENERAL ELECTRIC CO. CALIFORNIA OREGON POWER CO. . UTAH POWER & LIGHT CO. . IDAHO POWER CO. . THE MONTANA POWER CO. ROCKY MOUNTAIN ELECTRICAL LEAGUE

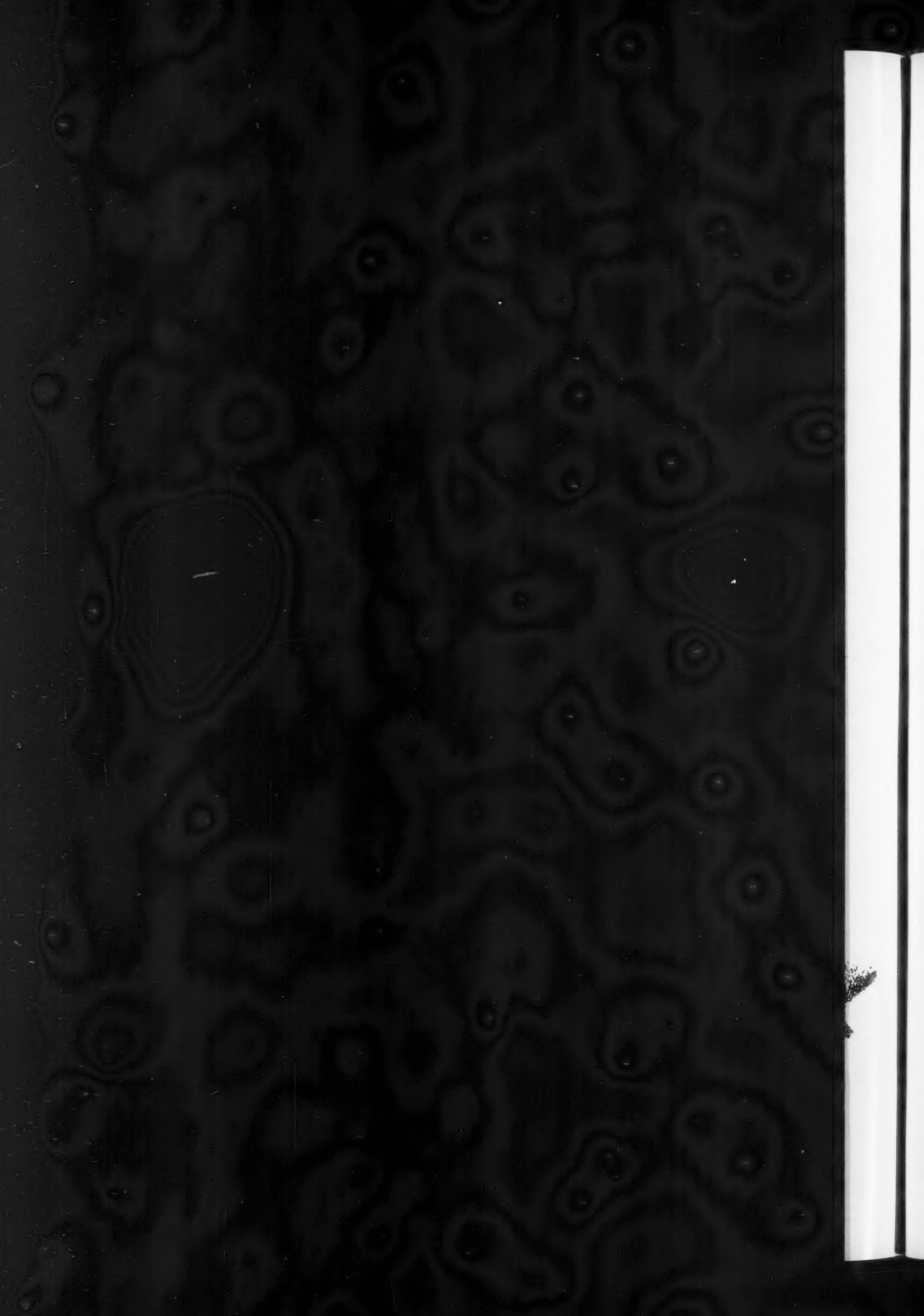
HERE'S AN IDEA

The trick in a window display of IES lamps is to get the passerby to see the lamps and to recognize what they do and how. It is desirable to have a home setting, perhaps window figures to give it life, but how to keep the passerby from looking just at the furniture or the dummies—that's the problem. The window display below (from Bon Marche, Seattle) won a prize by doing just that. Figures, dramatically arranged, start the interest. Furniture, just enough, no more, suggests home atmosphere. Cards and lettering tell the story. Lamps show typical merchandise.



An alternate and very effective window can be one iterally filled with lamps—floor lamps, table and end-table lamps, pin-to-the-wall lamps, shades and reflector bowls. Several of the lamps should be lighted. Then the passerby sees nothing but the lamps. Many like to "window shop" that way. Cards should tell the story of eye comfort (such as on the inside of this Guide) in brief wording. Full windows, used by many chain stores, often pull strongest.

YOU MIGHT TRY



NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION

Utilization Data Sheet No. 27

SUBJECT.....STATIC ELIMINATION AND INK DRYING
CUSTOMER.ANACONDA STANDARD, ANACONDA, MONT.
TYPE OF BUSINESS.....PRINTING
SIZE OF BUSINESS.....30 EMPLOYEES
SERVICE COMPANY.....MONTANA POWER

Prepared by John W. Cromer for the Commercial Section

This device, installed on a Meihle flat-bed roll press, was designed to eliminate charges of static electricity on printing presses and to start immediate drying of ink on all types of printed matter.

The unit consists of two 115-volt, 750-watt Calrod oven units straightened out, placed parallel and separated by a space of ½ in., and enclosed on the top and sides by a heavy metal reflector—which also supports the units—leaving the bottom open for concentrating and directing heat down onto the paper coming out of the press. The two units are controlled by a three-heat switch. In addition to being equipped to permit choice of three intensities of heat, the unit is supported on the machine in such a manner as to be readily adjustable up or down, to throw more or less heat onto the paper, and may readily be locked in a position well away from the paper in case of a prolonged stoppage of the press.

Many times it is found necessary to run the unit on high and clear the traveling sheets by not more than ¼ in. Since the amount of heat to be applied is dependent upon the type and condition of paper as well as the condition of the air (temperature, humidity, etc.) all of which vary widely—the choice of three degrees of heat in combination with the adjustability of the unit, enables the operator to meet any condition that may arise. The heat should be directed onto the printed side of the sheet if this is possible. In cases where this is not possible because of the construction of the press, the heat may be directed upward onto the unprinted side of the outcoming sheet.

With the effective length of these units at about 42 in., we get approximately 35.75 watts per linear inch when the device is on high (1,500 watts)—this appears to be sufficient for practically any type of paper.

Advantages

This method has the following superiorities over other methods: (1) practically eliminates the process of slip-sheeting; (2) saves wastage of expensive paper stocks; (3) permits direct routing of job through the shop, going directly from printing to folding, etc.; (4) reduces fire hazards; (5) combines ink dryer and static eliminator in a simple, compact unit; (6) inexpensive in first cost as well as operating cost; (7) speeds up production; (8) enables darker half-tones to be run on enameled paper without smearing; (9) does not smudge the paper.

Equipment Installed

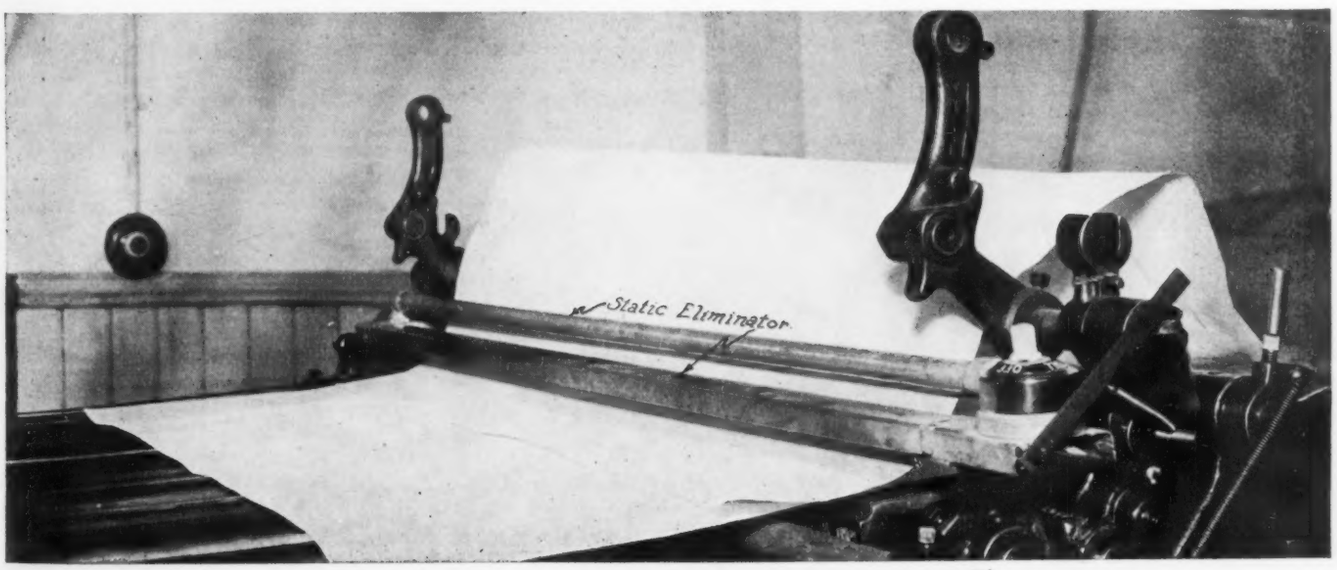
2—No. U194P26, 750-watt G-E Calrod Units	$ 8.50
1—3-Heat heavy-duty switch, SW156P2	1.50
Miscellaneous materials and labor	10.00
Total	$20.00

(Plug-in equipment)

Operating Data

Product	Job Printing
Labor	300 Man hrs. per month on job press
Operation	6 to 8 hr. per working day
Fuel	1.5 kw. of electric heat
Consumption	No accurate record

(Unit is usually on high for the duration of a press run.)



NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION

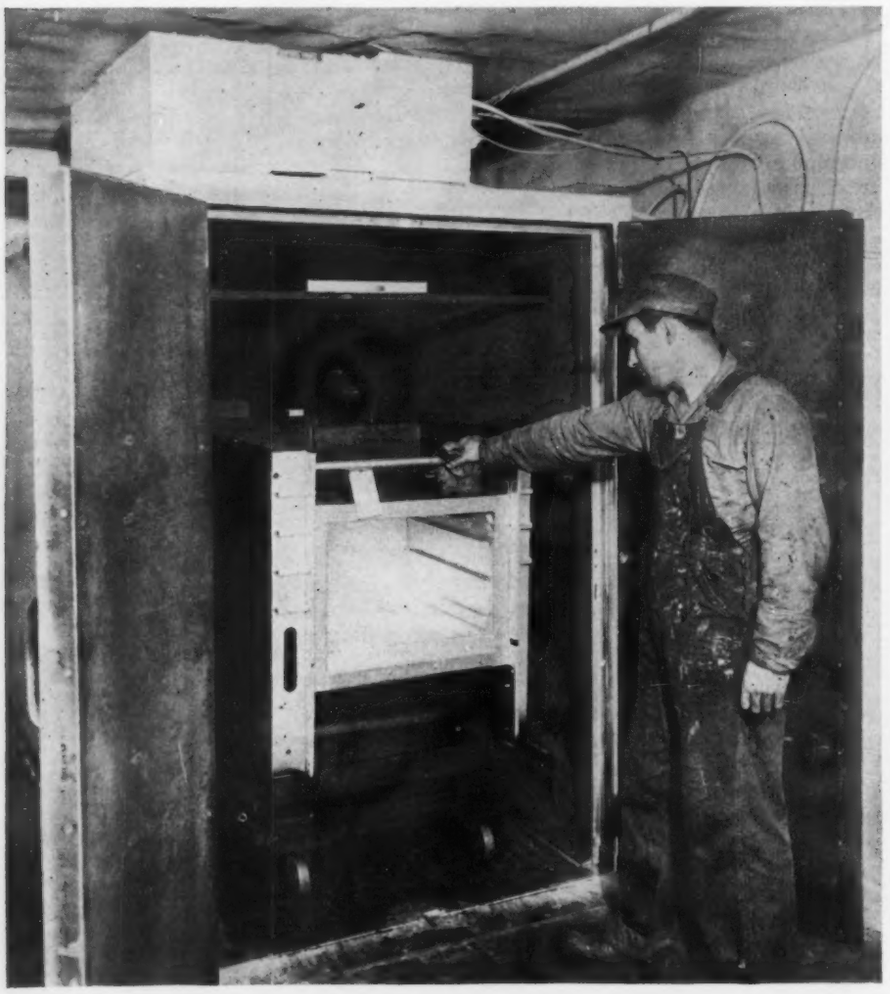
Utilization Data Sheet No. 28

SUBJECT.....ENAMEL BAKING OVEN
CUSTOMER.....LANG MANUFACTURING CO.
TYPE OF BUSINESS.....STOVE MANUFACTURING
SIZE OF BUSINESS.....68 EMPLOYEES
SERVICE COMPANY.....PUGET SOUND POWER & LIGHT

Prepared by H. Van Wyk
for the Commercial Section

Wrinkle (or crackle) finishes are used extensively in this industry as well as in many other metal trades. With the old type oven, where the source of heat was applied either directly inside the oven or by means of a fire chamber, these wrinkle finishes never came out uniformly and, as the trade calls them, many "fish eyes" occurred in the finish. It was difficult to expel the volatiles generated from the oven because enough fresh air could not be introduced without cooling the oven off.

The method of air circulation and recirculation of part of the air has overcome this difficulty and a smooth wrinkle finish is the result. Electric elements may be placed in most any location and therefore lend themselves readily to this type of drying oven.



The electric heating elements are placed in a duct space on top of the oven, a blower is connected to one end of this compartment and runs to one side of the oven which has an air chamber from which the air is released through slots arranged as shown in the picture. This assures an even distribution throughout the oven, as there are similar slots on the opposite side of the oven through which the air is sucked back to the blower and recirculated. Enough fresh air is mixed with the recirculated air to allow for the volatiles to be driven off through a vent in the top of the oven.

The whole process of baking three ranges takes only 45 min. The oven is thermostatically controlled. The ranges may be removed while the blower is operating without any appreciable heat loss.

This type of oven has proved very successful in filbert drying at lower temperatures and also in plastic coated boards. It should be successful in dehydrating apples and other such products.

Advantages

Advantages of the baking process include: (1) better finish; (2) wrinkle uniform over entire surface; (3) harder surface; (4) increased production; (5) compactness of equipment.

Electric heat yields: (1) saving of labor cost; (2) low installation cost; (3) close temperature control; (4) automatic operation; (5) low maintenance cost; (6) simplified construction for air-circulated drying oven.

Equipment Installed

Replacing 5-kw. Old-style Oven)

	Rating	Cost Installed
3—5-kw. No. 18 Nichrome No. 5 heating elements	15 kw.	$600
1—No. 1¼ Peerless utility blower	¼ hp.	
1—Thermostat		
1—45-amp., 3-phase contactor		
Total	**15.19 kw.**	**$600**

Operating Data

Product	Wrinkled finish ranges and parts
Production	3 per hr.
Labor	160 man-hr. per month
Operating period	6 hr. per day
Temperature	250-500° F.
Baking time (3 ranges)	45 min.
Warm-up period to 250°	30 min.
Warm-up period to 500°	90 min.

Portable Substations

Units prove useful in avoiding outages and overtime; several now in use here in the West; further applications seem likely

By D. C. Keller

A GROWING interest has been expressed in recent years in the application of portable equipment to facilitate inspection and maintenance of substation equipment, and for use in emergency service. Uninterrupted 24-hour service in the light and power business has become more necessary than in any other branch of public service. Many schemes have been tried and many types of apparatus have been used to maintain continuous service. At present there seems to be considerable interest in an entire substation that will fit all emergencies and can be moved into place with a minimum of lost time, and will act as a service protection until the emergency has passed.

We have all encountered various types of substation equipment that because of increasing demands has been made portable. For a few moments we might consider some of these. We mount our welding motor-generator equipment on wheels or in the rear end of a light truck, and now take it to the job in place of bringing the work to the machine. Larger motor-generator sets have been set on truck bodies or flat cars, and used as portable railway substations. We have portable light-weight motor-generators that are always available in an emergency to take the place of the ones that run our neighborhood movies. Motion picture studios carry their own sound proof light plants to unimproved locations and some of our larger circuses have portable generating stations, portable distribution stations, and portable distribution systems that are far better than the old gaslight days.

Everyone who has been connected with the operation, construction or distribution end of the light and power business has had experiences when he would have liked to have Aladdin's Lamp or to be able to press a button and make things normal so that time would not be the prime factor and a real job could be done. In case of a service outage, most repair jobs are temporary. These temporary repairs generally become permanent until they cause further trouble.

It is a proven fact that equipment of all kind requires regular, frequent, and careful inspection to give its best service. This applies to all types of substation, as well as distribution equipment. The only manner in which equipment can be thoroughly and properly inspected is by taking it out of service. Many means have been employed to accomplish this without an interruption: By the installation of duplicate transformers so that an over-capacity is available transformer banks can safely be taken out of service for maintenance or inspection; by installing duplicate or auxiliary busses, substation flexibility is greatly increased; by using by-pass switches, oil circuit breakers, regulators and other apparatus can be safely and easily removed from service; by means of disconnecting or group-operated switches or oil cutouts, primary and secondary circuits may be interconnected so that they can be fed from adjacent substations or feeders. All of these methods are being used at present in one form or another in both major and minor substations. Some of these methods are economical and very satisfactory where the design of the system facilitates their use. In other cases the revenue from the load prohibits the investment of too much money for duplicate equipment, or equipment not in continuous service.

The purpose of this paper is to deal with a complete, package type, portable substation that will facilitate cutouts without interruption of service and will be flexible enough to be economic and of general use.

The portable substation is not a new nor revolutionary idea in any manner even in our territory. Puget Sound Power & Light Co. has had for many years portable substations mounted on barges for use in dredging, pile driving and all types of harbor and bridge construction. They consist of three 300-kva. transformers, 13,800/2300 volts, connected delta on both sides. The high-voltage side is protected by S.&C. fuses and disconnecting switches. The secondary is run through a small switchhouse containing an oil circuit breaker, metering transformers and relay equipment. This unit can be towed to any necessary location near a 13-kv. line, tapped on, and is ready for use.

British Columbia Electric Railway Co. has one portable substation, which is used for railway power purposes. It is mounted and housed on a street railway car and contains a three-phase step-down transformer, suitable for a primary voltage of 34,500 or 11,500, as may be required, and a 1,000-kw. synchronous converter, 575 volts, d.c. There is an oil circuit breaker on the high-voltage side of the transformer and complete low tension a.c. and d.c. switchgear for automatic operation of the entire unit. Provisions are made for two outgoing d.c. positive feeder circuits. This unit has been in almost continuous use being shifted to the place of need to overcome emergency transportation demands, such as race

meets and exhibitions, and for breakdowns of permanent substation equipment.

Washington Water Power Co. uses a portable substation mounted on a trailer. It consists of a bank of transformers and an oil circuit breaker together with portable cables for making high-voltage connections. It was originally built for use on the a.c. underground system. When this system was in its earlier stages of development this substation was of great service as it could be quickly installed into the network in case of transformer failure or removal. The voltages were 2,300/4,000Y on the high-voltage side and 120/208Y on the low voltage side. The underground system of Spokane has been developed now so that this station is of little use in that capacity.

Puget Sound P & L uses a type of distribution substation that can be disassembled and moved from one location to another with no loss of material except the cement slab. These structures are of steel construction and built to standard specifications for small type suburban substations.

Northwestern Electric Co. has developed a similar type of substation which is semi-portable. This substation has a capacity of 840 kva., the rating being governed by transformers and feeder voltage regulators. It is served with one 11,000-volt line, and provides for one outgoing 2,400-volt three-phase feeder of 840 kva. capacity, regulated by two 200-amp. induction-type regulators. The equipment is housed in a small steel building of ready-made type. The building is mounted on a heavy structural steel base making the entire unit portable. Such a substation is used on new or temporary locations until a permanent structure is built.

The above proves that the portable substation is a useful if not necessary piece of equipment in our territory. The question which arises is whether this type of equipment can be applied to our already developed systems in an economical and inexpensive manner.

Several of the large electric manufacturing companies have developed complete compact portable substations in the package form which can be set up at the factory according to specifications and be ready for use when received.

One company has developed a new type of tank design and cooling system for its transformer, thereby reducing the weight considerably below that of the conventional power transformer. A shell type of construction is used for the core and coils because of its compactness and the ease with which it can be cooled when placed on its side. These transformers are placed on their side to reduce the height. A cooling system similar to that used on locomotive transformers is adopted. There are no packing glands on the pump and the motor is cooled and lubricated by the transformer oil. These transformers have been developed as three-phase units, but can be supplied single-phase.

This transformer unit may be mounted on a low-body trailer along with an oil circuit breaker and disconnecting switches on the low-voltage side and an air break switch and fuse on the high-voltage. Relay protection is included. Lightning protection is provided for both sides.

Flexible leads with patented hot-line-tool clamps are used to connect onto the line and feeder. Live parts are of a height that will keep the workman in the clear while cutting the unit in. No guard fence is provided on the trailer so some form of protection would have to be installed if the apparatus were left in service.

The type of transformer used in this substation can be furnished by special order for any convenient capacities with any specified taps in both high- and low-voltage windings.

NORTHWEST ASSN. REPORT

This is one of the papers presented by the apparatus and design sub-committee of the Electrical Equipment Committee (J. Hellenthal, chairman) at the 1940 meeting of the Engineering & Operation Section, Northwest Electric Light & Power Assn. D. C. Keller is with Puget Sound Power & Light Co.

At present the manufacturer is only producing this equipment in the 1,000-, 1,500-, and 2,000-kva. units.

The following is a comparison of weights and dimensions of the 2,000-kva. transformers:

	Portable Transformer	Standard Transformer
Height	62 in.	143 in.
Width	46 in.	88 in.
Length	105 in.	113 in.
Weight	13,400 lb.	23,000 lb.
Complete substation		20,775 lb.

Another leading manufacturer has made a thorough study of the portable substation field and has developed two classes of station: One is a self-cooled portable transformer interchangeable with the non-portable unit, with all the features of the permanent substation. It is large and heavy and suitable for supplying growing load of existing stations, or for types of service which require the use of spare units for long periods of time. The second class is designed wholly for emergency service. It is of low gross weight and designed to travel long distances at high rates of speed. Some features, considered unnecessary, are sacrificed to keep this class of station at a minimum weight, 10 tons or less. These stations are complete for immediate service, and are within the accepted highway weight limitations of approximately 35,000 lb.

This limitation restricts the self-cooled transformer kva. to approximately:

Kva.	Volts Primary
1500	15,000
1250	25,000
1000	34,000

These ratings may be increased 20% by the use of air-pressure-cooling.

If the newer type core-wound transformer is used with forced oil circulation, a 25% to 50% higher rating is obtained for the same weight, and a weight reduction of about 33% is obtained by omitting load ratio control equipment and simplifying the tap changing mechanism.

This manufacturer has several novel and convenient features, such as a high-voltage disconnecting-switch assembly that can be lowered for transporting and raised when installed. This is standard for all its portable substations.

If we could build a tailor-made system of substations and distribution, we could design that system so that the portable substation would be beyond a doubt both indispensable and economical. We could make all our units of similar design and capacity and provide a suitable parking place for the portable unit with easily adapted connections. Such a system would facilitate inspection, maintenance and changing of permanent equipment.

We cannot rebuild our systems to accommodate a new feature, and as no two systems are identical we are forced to analyze each case and adapt the new feature to it.

Some of the major obstacles that will be encountered in using a portable substation on an old system are:

1. A flexible transformer must be selected that will be adaptable in the greatest number of places.
2. Where can such a station (trailer type) be parked, and safe-guarded?
3. How will it be connected to the line and feeders because of the type of permanent construction?
4. What are the highway laws in your particular locality governing weight, width, height and trailer type?
5. How often would such a station be needed?

Some of the older systems do not hold fast to transformer connections nor voltage. Some parts of these may be star to star, or delta to delta, or a combination of both. Some systems use various voltages for distribution varying from 26,000 to 6,900. In cases of this kind it is difficult to obtain a single-unit transformer that is flexible enough to meet all demands. These new-type portable transformers can be furnished with standard taps to make them more flexible than any standard power trans-

formers of the permanent substation type. Of course, the more complicated the tap changing mechanism, the heavier the transformer and the higher the cost.

Only a complete survey of the system upon which the portable substation is to be used will indicate whether there will be difficulty encountered in parking and safe-guarding the apparatus. The space required would be, roughly, 15x25 ft. for the substation and fence. If the distribution substations are of pole-top construction and are close to highway or road shoulders, it may be hard to find convenient parking room close enough to make connecting easy. This may be overcome by tapping onto the primary lead at the nearest accessible place, and running long secondary leads to pick up the load. A close study should be made of each and every installation and a plan mapped out to facilitate the use of this equipment. Each transformer that is to be replaced by a portable substation is an individual problem for the distribution or substation engineers.

Different types of construction will necessitate different methods of connecting portable substations to the line and load. If the distribution line and the secondary feeders are on the same poles it may be necessary to set a stub pole to one side of the permanent station and drop the distribution line to this stub before connecting the primary of the portable station.

If the leads to the line and feeders are not too long with ample clearances, it may be possible to use straight leads from the portable station to line and feeders and clamp them on with hot line tools. After surveying the existing construction some line work may have to be done to facilitate the use of a portable substation.

Highway regulation of the territory will have a certain influence on the design of the portable substation used. Allowable weights vary between states from approximately 12,000 lb. to a maximum of over 50,000 lb. The width is limited to 8 ft. in all but two states, which permit 8 ft. 6 in. Height limitations vary from 11 ft. 6 in. to no limit. However, it is well to stay within a height limit of 10 ft. because of low bridges and tunnel clearances. Most states permit full trailers, that is, trailers with front and rear axles, but seven states demand that the front end be supported by the towing truck.

The frequency with which a portable substation will be used depends largely on the maintenance and inspection program of the operating company. I believe that it is an accepted policy to inspect all equipment completely at least once a year and to do the necessary maintenance at the inspection period. To inspect a distribution substation completely it is necessary to take the equipment out of service. If you have no way of picking up the load from other sources it means an interruption of service to that community. Continuous 24-hr. service is necessary in suburban areas as well as in metropolitan areas. With the late running of wayside inns, and service stations, and the early opening of chicken ranches and dairy farms, the 24 hours are completely filled with demand for service. To interrupt such demands is an inconvenience to the customers. If interruptions are unavoidable they must be taken at night or week ends, entailing additional overtime expense. If a portable substation is employed to bypass these distribution substations the inspection and maintenance work can be done at the operating company's convenience with no interruption to the customer and with no additional cost for overtime.

Throughout the east and in some sections of the mid-west portable substations are being used with wonderful success. In a recent news issue of *Electrical World* an article described a portable substation built in the shops of the Buffalo Niagara Electric Corp. for field use in relocating and revamping existing secondary substations. This substation has been in use for two years and has already paid for itself.

The January issue of the *Electric Journal* cites the Philadelphia Electric Co. as an advanced user of portable substations. This company has seven portable substations in use now. They are factory-built and can be set up in a few hours. They are dismounted from the trailer so that only one trailer is required. The primary voltage is 33,000 with 4,160 volts on the secondary, and they have a capacity of 1,000 kva.

If this is a convenient and economical operating method in other parts of the country it should at least be considered for our locality.

From a hasty survey of the Puget Sound system, with which I am connected, I would say that a portable substation of from 600 to 1,000 kva. would be of the most general use. This station should have the following equipment:

1. 1 600- or 1,000-kva forced oil-cooled, three-phase, delta-connected transformer, mounted on a low body, and axle trailer.

High voltage.....	13,800	13,200	12,600
Low voltage.....	6,900	2,300	440

2. High-voltage disconnecting switch and fuses on an adjustable tower.

3. High-voltage arresters.

4. Low-voltage oil circuit breaker and disconnecting switches.

5. Low-voltage arresters.

6. Low-voltage operating panel with reclosing feature for 1 or more reclosures, overload relays and metering equipment.

No load-ratio-control would be necessary and taps could be changed when station was dead. The portable station could be made available for emergency work, inspections, and for a reserve capacity for 80 to 90 minor suburban substations and small urban substations of our company. It could be used as a temporary installation while permanent stations were under construction and would be a great saving in overtime work. Such a portable station would not decrease the number of interruptions but could be used to shorten the length of a number of them. It is difficult to figure in actual dollars and cents what the cost is to an operating company in the case of power failure or interruptions.

In writing this paper one fact that impressed me was the durability of our modern transformer. I can recall only a few actual power transformer failures within the past five or six years wherein a portable substation would have been of great assistance. Most of our interruptions have been of short time interval and could not be greatly aided by the use of portable equipment. That is to say, a very large per cent of our interruptions could be straightened out by field crews in about the same or less time than it would take to install a portable station.

I am strongly in favor of such equipment for use in both inspection and maintenance work, but it is impossible to show what the actual saving would be in such usages.

Inasmuch as the transformer is the only special equipment, all other equipment being standard and adapted to the portable assembly, it is of interest to compare the costs of the special or portable transformer and a standard power transformer. This is done in Table I.

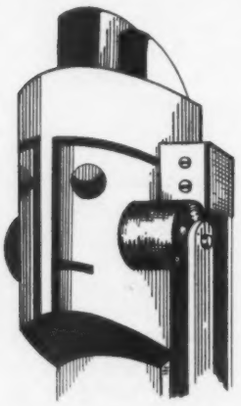
The portable units, complete with transformer, switchgear and trailer are estimated at $9,232 for the 600-kva. and $11,022 for the 1,000-kva. units.

Table I—Substation Cost Comparisons

600 kva., 3 phase, 13.8/6.9-2.4/0.44 kv.,	portable	$4,087.00
	standard	3,200.00
1000 kva., 3 phase, 13.8/6.9-2.4/0.44 kv.,	portable	5,877.00
	standard	4,157.00

Inert gas equipment extra.

ABC's of Relays



Part I—This opening chapter in the relay series tells how relays were born—why the fuse proved inadequate, why the relay quickly outgrew its initial simplicity

By E. B. Kipp

THE modern protective relay had its beginning in the humble fuse. As capacities of generators and electrical systems grew, engineers began to encounter difficulties which the simple fuse could not overcome and as a result the mechanical circuit-breaker was brought into use. Since the fuse operated on over-current, it was natural that over-current should be used to operate the breaker. The device which was developed for doing this was the relay —an over-current relay.

The first relay was simple, consisting of an iron plunger within a solenoid, something like the modern door-chime. When the current through the solenoid exceeded a pre-determined value, the iron plunger would jump up to center itself in the field of the solenoid and would forcibly strike the latch of the circuit-breaker mechanism. This would allow the breaker contacts to open, and the circuit would thus be interrupted. The setting of the relay could be varied over fairly wide limits by turning an adjusting screw which raised or lowered the iron plunger and thus changed the pick-up point.

This simple relay has since been equipped with contacts, placed in its own glass-covered case and given the dignified title of "Fault Detector." It still plays an important part in protective schemes, as will be seen later.

As the electrical industry grew, transmission lines reached out farther and farther for new consumers. The difficulties of supplying continuous service grew apace.

With a single continuous line running from the generating plant, any sort of heavy over-current anywhere on the line would trip out the main breaker and interrupt power to all customers on that line. By breaking up this same line into several sections, with breakers between the sections, it became possible, for example, to have an overload at the extreme end trip off only that breaker farthest from the plant.

This scheme was effected by tapering the relay settings from some maximum overload value for the generator breaker to some lower value at the remote breaker. However, with the simple plunger relays (which were practically instantaneous in action), it is apparent that the problem was only partly solved, since heavy short-circuits, even at the far end of the line, might operate the generator relay and completely disrupt service.

From this early operating experience, it was seen that selectivity by current setting alone was of small value and that time was an important factor which must be taken into account. Time delay in the plunger relays was introduced by means of oil dash-pots or leather air-bellows, which were crudely adjustable to allow the longest time settings at the generator and the shortest at the end of the line. Short circuits would then generally trip the nearest relay and allow the service to continue uninterrupted to consumers near the generating station. The time-delay relays would also permit harmless overloads of short duration, and would give faults a chance to clear before tripping off the circuit.

But the time-delay plunger relay was not an entirely satisfactory device because its timing accuracy was affected by temperature and climatic conditions. This meant that settings were necessarily coarse, by reason of errors in the relays themselves. Furthermore, operating characteristics were limited to those of the simple plunger. So relay design engineers were soon casting about for a new principle of operation.

At that time electrical characteristics of transmission lines were not thoroughly understood. But what appeared to be needed was a relay which would operate at definite current values and follow definite time characteristics.

The induction watt-hour meter had already reached a fair stage of development. Here was a pure electro-mechanical device of high accuracy and great reliability, and it seemed natural that the relay designers should turn to the induction-disc principle of the watt-hour meter for their new development.

Mechanically, the watt-hour-meter element consisted of an electro-magnet, disc and bearings and was even then quite similar to present designs. The electro-magnet had both current and potential windings. It was the interaction of the magnetic fluxes from these two windings that made the disc rotate.

The meter was a watt device (i.e., it operated on the product of volts times amperes), but the relay engineers were at that time primarily interested in a unit which would operate on current alone. Such obedience was secured by equipping the electro-magnet with two current windings. The first winding carried the main operating current and supplied current to the second winding by transformer action, This, in effect, produced the conditions found in the watt-hour meter except that in this case the relay operated on current alone.

Other changes in the meter design included the addition of a set of contacts which would close after a certain travel of the disc and a spiral spring which constituted the measuring element and normally held the contact in the open position.

In the old plunger relay, the current setting was varied by adjusting the position of the plunger in the solenoid. In the induction relay, the current setting could be adjusted by means of taps in the main current coil and also by varying the torque of the spring. With the spiral spring, however, the spring-torque increased as the disc was rotated and it was necessary to find some means of overcoming this characteristic of the spring. The solution turned out to be simple. Accurately calculated holes were punched into the disc and were so placed that the area of solid disc in the electro-magnet air-gap increased on a direct ratio with the increase in torque of the spring as

the disc rotated. The torque generated in the disc with a certain relay current thus exactly balanced the spring torque, and, if the current remained just above the "pick-up" point, the disc would rotate at constant speed to close the contacts.

Dash-pots and air-bellows on the old plunger relay gave adjustable time delay. In the induction-disc relay, time delay was obtained by adjusting the travel of the contacts and the strength of the damping magnets. Since the speed of the disc was practically proportional to the current flowing in the winding, the relay was said to have inverse-time characteristics. That is, the greater the current the sooner the contacts closed.

From this, it is evident that on very heavy currents the action of the relay would become practically instantaneous and the advantages of time-selectivity would be lost. To place a definite limit to the inverse time characteristics, a small "torque-compensator" was placed between the first and second current windings in the relay. The torque-compensator was merely a small-core transformer which was designed to become saturated when primary current reached a certain value. Currents greater than this value would thus create no further increase of current-flow in the second winding.

This is what produced the flat part of the over-current relay curve, or what is termed the definite-minimum time characteristic of the relay.

From the common watt-hour meter came other protective relays as well. These will be discussed in an early issue.

Color Photo

Tapped transformer permits control of light source

By T. W. FITCH
Portland General Electric Co.

Tests conducted in Portland at the A. J. Baker Commercial Photographic Studio, have convinced illuminating engineers of Portland General Electric Company of the advantages of controlling the color temperature of incandescent light sources for color photography by means of rigid control of light-source voltage. This has been accomplished by developing a multiple-tap transformer offering a wide range of selected voltages.

While photographic lamps are rated at 3,200 and 3,400 deg. Kelvin, these color temperatures are obtained only when the lamps are operated at certain voltages. Higher voltages produce light of higher Kelvin degree, with blue predominating, and conversely for lower voltages—with red predominating.

A filter can do more than modify the light produced by a given source, and can vary the resultant color temperature only by absorbing unwanted wave lengths, with consequent loss of energy. When socket voltages vary from outside and inside load conditions, obtaining and retaining proper spectral characteristics at the light source becomes extremely difficult.

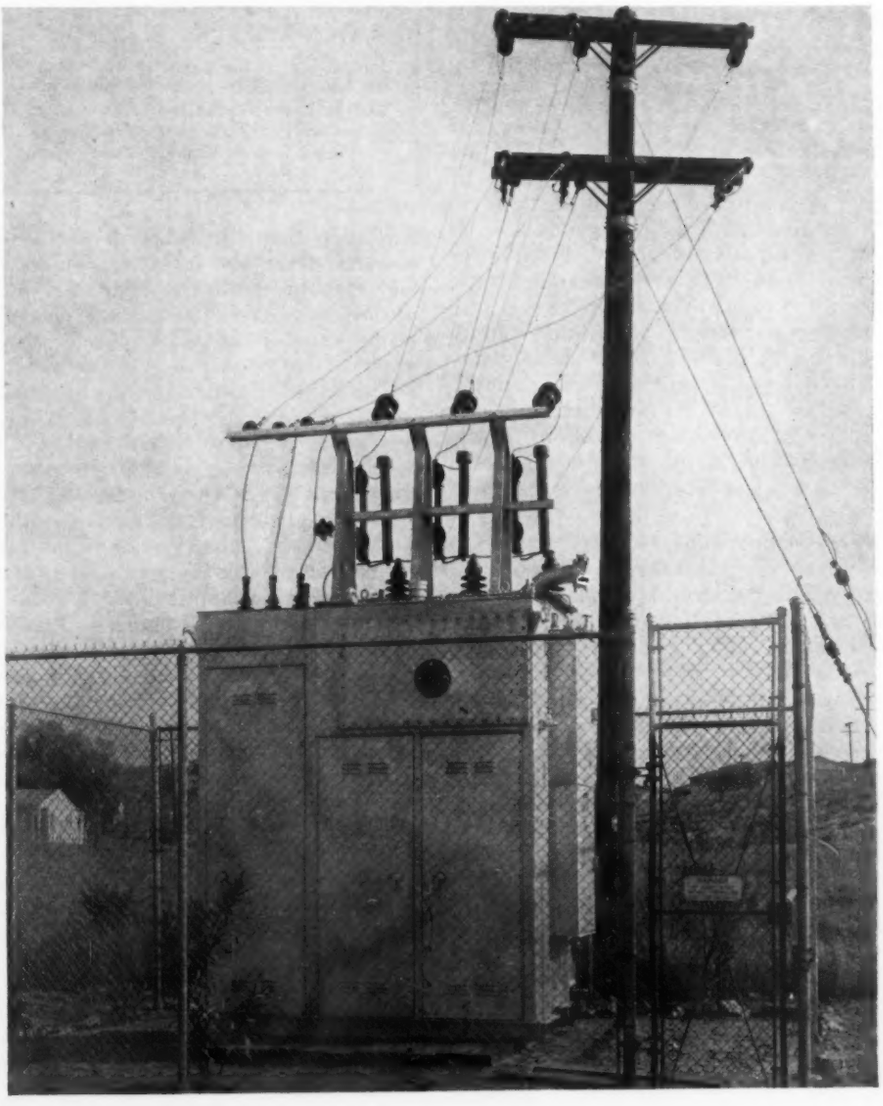
Color films for commercial use are balanced to a given color temperature and must be used with a source giving this temperature if true colors are to be reproduced. For best results, the temperature should be within 100 deg. Kelvin of that required by the film.

The effect of voltage variation on the color temperature of light produced was determined by transferring the lamp bank feeders from the house service to current supplied by a mobile 12½-kva. generator truck. Voltage was controlled by varying the generator field voltage. Voltage was checked at the main with a portable voltmeter and color temperature of produced light was measured with an Eastman color-temperature meter. Results indicated a variation of approximately 12 deg. Kelvin per volt, thus proving that close control of color temperature was possible.

As a result, two 120-volt, multi-tapped auto transformers were built into a panel and installed. A voltmeter was mounted on the control panel with a double-throw switch to check transformer voltage. Very fine transformer adjustment was provided to permit com-

Unit Substation Added in Southern California

Near Manhattan Beach, not far from Santa Monica Bay, Southern California Edison has installed this G-E automatic single-circuit substation. It is rated at 50 cycles, 1,000 kva., 3-phase, 16,500 to 2,500/4,360-Y volts, is provided with load-ratio control, pellet-type lightning arresters, high-voltage fuses, metering and control equipment, and low-voltage oil circuit breaker



pensation for lowering of color temperature with lamp age.

The new method replaces all the filters formerly used. It is applicable not only to color work but also to black and white. By making it possible to eliminate separate sets of lights for color and for black and white, it offers an opportunity to improve load factor and reduce demand charges for commercial photographers.

Eastman Kodak Co. has secured permission to advertise the details of this system, and transformers permitting this close voltage control are now being produced commercially.

Welding Waterwheels

By A. P. NEWBERRY
Puget Sound Power & Light

My material is based almost entirely on experience gained on propeller type wheels rated at 21,000 hp. at 32 ft. net head and 100 r.p.m. These wheels are of the manually adjustable blade type on vertical shafts with six cast steel blades per wheel. Operating gross head varies from 21 to 39 ft. and blade angles are adjusted to maintain the maximum possible power at the low heads and to operate at high efficiency during very low water. Up to 25,000 hp. is developed at the high heads. Such a wide range of operating conditions causes much variation in pitting action, both in degree and location.

Under certain conditions of head and blade setting, pitting occurs on the top side of the blades along the leading edge and the periphery and in extent is about 10% of the area of the blade. Pitting is rather moderate here except along the periphery. Under other operating conditions, pitting occurs on the under side of the blades near the center and along the trailing edge near the periphery. The action here is very severe, as much as 50 lb. of metal being removed from a single blade and to a depth of approximately 2 in. in about 4,000 hours of operation. Pitting occurs also on the discharge ring below each wicket gate and on the draft tube liner in line spirally with the wicket gate and that on the discharge ring. All these different degrees and positions of cavitation together with the necessity for getting the work done with a minimum outage make it important to develop methods that will place metal in a minimum of time and produce surfaces that will have as long life as possible consistent with cost.

Our waterwheels have now operated around 55,000 hours and we started welding after approximately 14,000 hours of operation. All work of this nature is done during March and April of each year so there is a period of around 8,000 hours between each inspection.

We have found that the preparation of the surface to be welded is quite important both as to time required for the work and quality of the material as welded. Our practice is to remove all of the honeycomb either by burn-down with a carbon arc where the surface is horizontal and the metal can be puddled to a solid condition or by chipping on vertical and overhead areas. Where the cavitation is not sufficiently deep that there is room for two layers of weld to be applied, chipping to that depth is done. It has been our experience that the welded metal is more resistant to cavitation than the original cast steel and that the second layer is more resistant than the first. The additional life of the second layer justifies the removal of the sound metal and replacement by weld.

NORTHWEST ASSN. REPORT

This is one of the papers presented by the Power Production Committee. (E. H. Collins, chairman) at the 1940 meeting of the Engineering & Operation Section, Northwest Electric Light & Power Assn.

The selection of the electrode material will depend on the severity of the pitting action and the position and extent of the area to be welded. In places where pitting is fairly mild we have had very satisfactory service from mild steel and use it wherever this condition exists because of its lower cost and greater ease of application. We have some of this material that has been in service for over 40,000 hours with no appreciable amount of cavitation as yet. Where the pitting action is severe, mild steel is of very short life, in some cases being entirely gone in 7,000 hours. We have found 18-8 stainless steel very satisfactory under these conditions and well worth the extra cost. Places where pitting has progressed to a depth of nearly an inch in some 7,000 hours have been repaired with stainless steel and show only slight etching after an additional 40,000 hours.

The time required to place a given amount of stainless steel on horizontal surfaces runs about 20% more than for the same amount of mild steel, the time for grinding about 30% more and the cost of material about 800% more. On overhead work, these figures would increase to 30% extra for welding, 40% for grinding and 900% added cost of material. Indications are that where pitting is severe, the life of stainless steel will be from eight to ten times that of mild steel.

In the course of our welding operations, we have had some benefits from slight changes in the contours of some blades where pitting was very bad. A templet was made from a blade that was quite free from pitting and this was used as a guide in adjusting the contour of other blades. In some instances where pitting action had been heavy before, it was practically eliminated by slight raising of the surface and providing long approaches to the new elevation.

With the large physical size of our waterwheels there is ample space around the wheel to work and we have found it feasible to use as many as three arcs simultaneously. We have a 300-amp. motor-driven welding generator and in addition use our spare exciter to carry two additional arcs. To adapt the exciter for this, we built a reactor of heavy wire wound on a solid iron ring with the two circuits on opposite sides. For resistance, old streetcar motor grids were used with taps for different currents provided. To overcome the regulation of the exciter, a series relay set to pick up at well over the current required by one arc was inserted in the main lead from the exciter. This relay shorts out the necessary amount of field rheostat to compensate for the exciter regulation when the second arc is struck and thus maintain proper voltage on the arc already in operation. Stopping of one arc reverses the process and again there is no interference with the operation of the other one.

We have been doing considerable experimenting with metal spray on overhead work and while this method has several advantages over arcwelding, we have yet to determine the comparative values of the two methods. This process consists of feeding a wire into the center of a neutral flame of Acetylene, propane or natural gas and oxygen and blasting the molten metal in an atomized form onto the prepared surface with an airblast surrounding the flame. The metal thus applied is, of course, granular in form since the only bond between particles is the grip each one seizes on the rough edges of the preceding one. However, the metal can be ground and polished to a surface as smooth as welded metal. Although a hardness of over 500 Brinnell can be obtained and a resistance to corrosion comparable to welded stainless steel, this granular nature introduces some question as to the ability of this material to withstand severe pitting action.

Our experience has not yet been sufficient to permit definite conclusions to be drawn but certain advantages in application and the life indicated under moderate pitting action seem to warrant thorough testing of this method.

About the first question asked about this method is whether or not the metal can be made to stick firmly to the base metal. We have found that this is the simplest part of the job and that the natural honeycombed surface when thoroughly dried and cleaned with a coarse sandblast provides ample bond to retain an application over an inch in thickness. It is necessary that the surface be kept dry and free from dust and oil at all times until the spraying operation is completed. Even the oil deposited by feeling of the sprayed surface with the hand is sufficient to prevent the bond of further applications. It is also essential that only a short time elapse between passes or there may be enough oxidation take place to interfere with the bond. Reasonable care, however, will provide a very satisfactory bond.

Application of Metal

The application of metal by this process is very similar to the spraying of paint, the jet is passed slowly over the area with care that the jet is normal to the surface, until the desired thickness of metal has been deposited.

It is characteristic of this method that the high spots build up practically as fast as the low places and the surface at completion of the spraying looks just about as irregular as the original. This makes for much grinding of hard material to reduce the surface to the smooth contour of the blades. Some of this may be avoided by very carefully chipping out the higher points over the pitted area before spraying. There is danger in this operation of smoothing the surface too much to permit a strong bond if the base material is steel. I understand that successful applications have been made on cast iron wheels after chipping the entire area to nearly the bottom of the honeycomb.

While the preparation of the surface for a good bond is extremely important, it is not so subject to error as the actual spraying of the metal. In this, the condition of the flame, rate of feed, distance from the work and temperature all have serious bearing on the quality of the material deposited and these must be left to the judgment of the operator. The neutrality of the flame is determined by eye and a very little experience will enable the operator to adjust gas pressures accurately. Rate of feed has little effect on the quality of the metal as long as the flame is not overloaded which results in coarse grained work. Underfeeding only loses time and wastes gas without any appreciable improvement in quality. The distance from the work is very important and there seems to be a strong tendency on the part of the operators to get too close.

We have found that a distance of anywhere from 7 to 9 in. gives the best results and have provided our guns with a 7-in. bayonet to limit the minimum distance. The temperature to which the work is allowed to rise seems to be the most difficult phase to regulate and seems to be one of the greatest importance. Too high temperature destroys the bond between successive passes so that the deposit is laminated and breaks up easily. If temperatures are held at about the indefinite "lukewarm" a very uniform deposit will be obtained.

Our practice has been to prepare several places for spraying and rotate so that spray is applied to a given place for only a short time and then it is allowed to cool before more metal is deposited. A blast of air, filtered to remove all moisture and oil, directed against the work near the jet will help maintain low temperature and permit longer application of the spray before stopping to cool. We have recently been using propane gas instead of acetylene and find that the lower heat of the propane flame permits more continued application without excess temperature.

Main Advantage

The main advantage of this process is the speed with which metal can be deposited and its ability to operate equally well on flat, vertical and overhead work. It is possible to average better than 5 lb. of stainless steel per hr. or 40 lb. in an 8-hr. shift. When this is compared with a probable 8 or 10 lb. of overhead welding, there is a marked saving of required outage time which is usually of considerable importance. It is also possible with a spray gun to deposit metal in places inaccessible with an arc.

We recently repaired a small cast iron Francis runner on which pitting had occurred about the center of the blade. The spots were inaccessible with an electrode but were successfully filled with the spray gun although the pitting had gone entirely through the blades. Repair of sprayed patches where cavitation has started is very simple, only drying and sandblasting being required before new metal can be sprayed on. Repairing of welded stainless under the same conditions required chipping of very hard metal to remove all honeycomb.

Disadvantages, besides lack of positive records on the life of sprayed metal, are the dirt produced and the fumes. A small part of the spray bounds away from the job and settles as very fine dust and the fumes cause very severe headaches when first encountered. Apparently permanent immunity develops after the first headache, so this is a minor disadvantage.

This spring we applied some 625 lb. of stainless steel on the blades of our wheels, using high chrome which is very hard, some 18-8 stainless which has a Brinnell test of about 200 but which seems to be much less brittle than the high chrome, and some KA2SMO which seems to be slightly less brittle than the 18-8. This latter material is the same as the 18-8 except for 2% molybdenum added. Results of this application can not be determined until the next annual overhaul next March and April. Some data are available on high chrome steel applied last year but are not at all conclusive since we know that our technique at that time was not all that could be desired. Even with incorrect application, the sprayed metal where pitting action is only moderate shows very little sign of wear. Under the more severe conditions, the sprayed metal failed but under those same conditions the welded stainless has pitted quite considerably also. We believe that with improved technique much better life will be obtained from the metal sprayed this year than has been the case so far.

As to comparative costs of the two methods, for a patch requiring about 25 lb. of electrode we have found the cost of electrode to be $18.75 while the equivalent amount of spray material including gases would be $20.35. Labor for welding and grinding would be 38 man-hr. as compared to 12½ man-hr. for spraying and grinding. The less labor cost more than compensates for the higher cost of spray material and outage time is reduced to one-third.

The investment in equipment for spraying is considerable but so many uses can be found for it that the cost is soon saved on other work. We recently built up the shaft of a 5,000-kw. horizontal unit where it had been worn by the packing, built up eroded places on the cover plate, repaired the sides of cast iron wicket gates on an exciter unit.

In conclusion, I would say that our experience indicates stainless steel welded on steel will practically eliminate pitting where that action is moderate and will give the best service where conditions are severe. When ample time is available in which to weld and grind, this method will probably provide the cheapest maintenance. When outage time is of value, the metal spray process will probably effect overall economies. On cast iron and bronze, metal spray seems desirable because of the ease of application and freedom from the high temperatures that cause warping and cracking.

Chicks like these are kept warm and safe in reliable electric brooders on the Laura Scudder poultry ranch in Southern California. To obtain high quality fresh eggs for use in the famous Scudder Mayonnaise, electricity plays an important role

Good Mayonnaise Calls For Electric Brooders

DEPENDABILITY of electric brooding scored again as the deciding factor in the choice of brooding equipment for the Laura Scudder poultry ranch near Puente, Calif., which produces high quality fresh eggs for use in Laura Scudder's Mayonnaise, popular Southern California food product.

"We looked the field over carefully to find a brooding method on which we can depend absolutely," states Jack Scudder, superintendent of the ranch, "and electric brooders give us this advantage better than any other kind. We never worry about the brooders operating as they should. We know that electricity is on the job every minute. reliably keeping the chicks warm and safe."

Twenty-five outdoor electric broodings with a total rating of 6.8 kw. give chicks a healthy start in life on the 54-acre Scudder farm. These brooders have been in use since Laura Scudder purchased the ranch two years ago to raise her own fresh eggs for her mayonnaise. The ranch has a flock of 5,000 pedigreed White Leghorns of the Hanson strain, and the most modern methods are employed in their care. A running supply of fresh water is a part of the sanitary, especially constructed laying houses, where the Mmes. Leghorn lay their eggs in the privacy of enclosed nests. Their scientifically balanced feed is made from grain produced on the ranch. Citrus and avocados are raised on the ranch also.

Electrical methods used on the ranch exemplify the contributions which electricity has made to scientific poultry farming. Electric lights are used in laying houses to supplement daylight and produce more eggs. Eggs are candled electrically, and only the finest are rushed to the Laura Scudder plant. Eggs used to perpetuate the flock are incubated in a 3,000-egg incubator. Irrigation water for the ranch is supplied by a 25 h. p. electric pump.

Laura Scudder's Mayonnaise is produced under Laura Scudder's personal supervision in a modern plant located in Monterey Park, eight miles east of Los Angeles.

A view of a section of this modern poultry ranch that houses 5,000 pedigreed White Leghorns. Here eggs are laid in complete privacy. Cleanliness is a working motto in this "nightless" eggery

Rural Display

Colorado firm draws attention to electric chick brooders

Sponsored by the Montrose Flour Milling Co. of Montrose, Colo., recently was a display of electric chick brooders in the window of the Western Colorado Power Co.'s Montrose store. Serving a four-fold purpose to the utility and its customers, the display

(1) advertised the local mill and their chick feed, which, incidentally, is electrically ground, and also one of the utility's largest customers,

(2) chicks featured were raised by a local hatchery that also uses electrical incubators,

(3) the type of brooder used is sold by the Montrose Hardware Co., a utility customer, and

(4) the utility received a great deal of benefit, inasmuch as it was a live window display and pointed out the advantage of chickens raised with an electric brooder.

During the time the window was on display, folders and literature on electrical brooders and a small magazine entitled, "Electrical Helps for the Farmer," were handed to all rural customers entering the store.

Says D. L. Holt, sales manager of the Western Colorado Power Co.:

"The window attracted much attention and practically every hour of the day and up to midnight, people were standing in front of the window looking at the display. In fact, there were people who came every day to look at the window to see how fast the chicks were growing and to inquire how many we had lost to date. Most people were surprised to see how little care these chicks required by the use of the electric brooder and the fact that only three were lost during the two weeks of the display."

This clever, well-planned window display in Western Colorado Power Co.'s Montrose store attracted the attention of hundreds. Live chicks in the window brought many of these passersby back daily to watch the progress and growth of the tiny birds

Farm Figures

REA survey discloses high percentage of rural customers

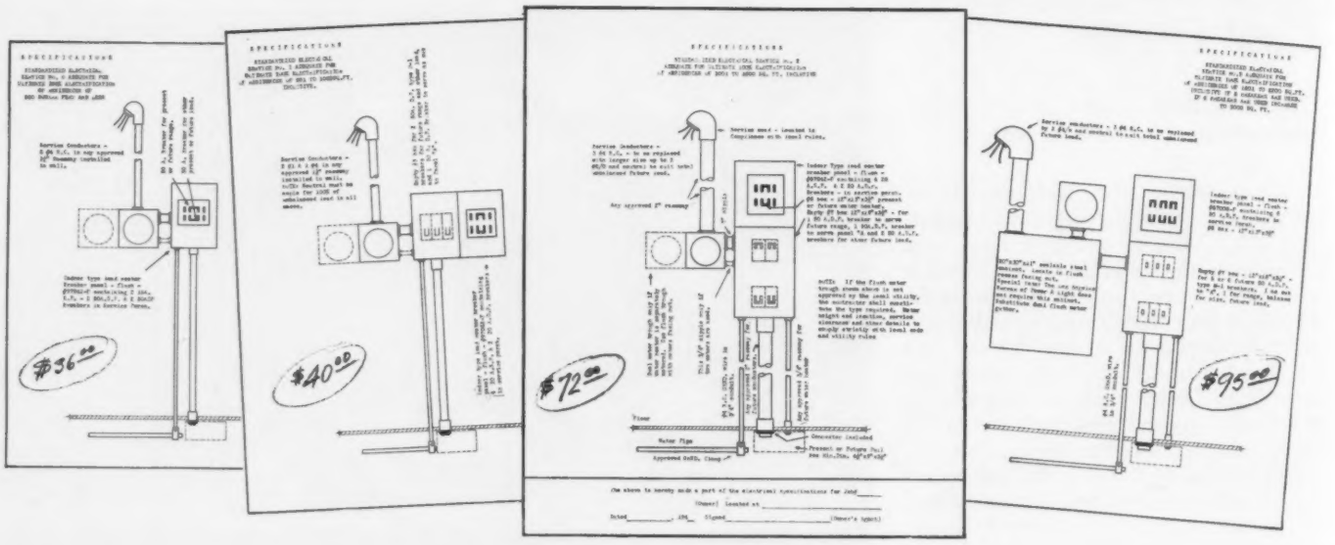
Approximately 1,700,000 farms, or 25% of the farms in the U. S., enjoy the advantages of high line electric service, according to Harry Slattery, REA administrator. This is well over twice the number of farms—743,954 or 10.9%—having such service shortly before the REA was established in 1935.

Of 688 REA systems, approximately 500 are in operation, with 180,000 miles of line energized, in 44 states. To achieve the rapid expansion in service during 1939, construction progressed at nearly 400 miles of line per working day, this volume being the equivalent of one average system completed every day.

Total allotment for electrification stood at $273,000,000, with wiring and plumbing installation allotments set at $5,000,000. *For further increased REA activity, see News section.*

● NEW AND PROFITABLE uses for electric soil heating cable on the farm have been developed through rural electrification research at the University of Idaho. One consists of the use of such cable for the heating of milk fed to poultry or livestock. A second use is the application of soil heating cable for melting ice in roof gutters and downspouts during the winter months.

SOUTHERN CALIFORNIA EDISON'S industrial exhibit of electric pumping was a feature at the last Los Angeles County Fair at Pomona. The exhibit was floodlighted at night and lighted in color below the water's surface. Many interested fair-goers were drawn to this unique display



Sell Standardized Services

A big enough "bottleneck" in the first place can now be effectively sold as a packaged job

HOW much better to provide a big enough wiring bottleneck when the house is built than almost to break the bottle in order to open it up for more electric service after the house is built! This philosophy can now go a long step further than the Red Seal Plan and Adequate Wiring programs by following through with the work completed by a special committee of Pacific Coast Electrical Assn. This committee has now offered to the industry, in turn to offer to architects and builders, a group of standardized service entrance specifications that will provide for complete electrification of a home at any time during its life.

First offered as a suggestion in 1938 by C. A. Rowley, it was described in an article, "Through the Wrong End of the Telescope", in ELECTRICAL WEST, Jan. 1939, p. 42. President W. W. Glosser of the PCEA appointed a committee headed by Rowley to develop the idea further. That committee completed its work of fitting the original plan to the exact local requirements of cities from San Francisco to San Diego so that it can truly be called a standardized specification. Now, at that committee's request, President Clyde Houston has appointed a new committee headed by J. H. Pengilly, to carry on the work of acquainting the industry with it and of promoting it with builders and architects.

To restate the advantages of selling a standardized service to every new house possible, a service designed to accommodate even the electric heating of that house and hence any and every possible use of electricity it might require in the future, it would:

1. Permanently remove the obstacle of wiring inadequacy.

2. Permit an installed price on heavy duty appliances really fair to contractors. To estimate such an installed price it would be necessary only to measure the number of feet to the service. The cost of a new service would not be there to stop the sale.

3. Increase the market for every use of electricity.

4. Reduce service calls because of inefficiently operating appliances or to replace fuses.

5. Give the customer full value in electric energy.

6. Remove the cost bugaboo from appliances.

7. Make it easy for architects and builders to specify an adequate service by number, based on floor area.

The need for such a "prescription" to apply easily to all new residences was realized keenly when Rowley, by a spot survey, revealed that of the new houses being built 64% are connected to 30-amp. service equipment which immediately eliminates them from heavy duty appliance sale and use. Economically they are lost to the industry as a market until new service equipment can be sold in addition to and on top of the appliances themselves. To 10,000 new houses, this cuts the industry off from $400 of appliances per house, or $4,000,000; wiring of about $450,000; revenue to the central station of $700,000 annually.

Much of this potential loss can be converted to potential business. It is the work of this committee and of the industry to convert it. With such incentive as the above, and with the acceptance the idea has had from the architects to whom it has been presented, and the further possibility that by standardization the benefits of greater volume production can further reduce costs, the idea should move forward rapidly, the committee contends.

Explaining briefly the specifications and how they are to be used, attention is called to the drawings at the top of the page. At the top of each is the word "Specifications," and at the bottom blank spaces to be filled with the date, job number and name of owner's agent, who may be architect, builder or owner himself. The drawing is to become an integral part of the building specification when properly endorsed and bound with the other provisions.

It was proposed that litho-printed copies of these drawings be furnished in quantities to architects and builders. With a stock of the four layouts on hand, specifying a 100% electrical service for any residence up to 2,200 sq. ft. floor area, it will be easy for the architect to compute the floor area and select the layout required—No. 0, No. 1, 2 or 3, as the case may be. In every case the equipment can be installed permanently and concealed, with full assurance that it will take care of every electrical need in the future without the necessity of

defacing its walls, inside or outside, by the addition of surface mounted raceways, switches, or equipment.

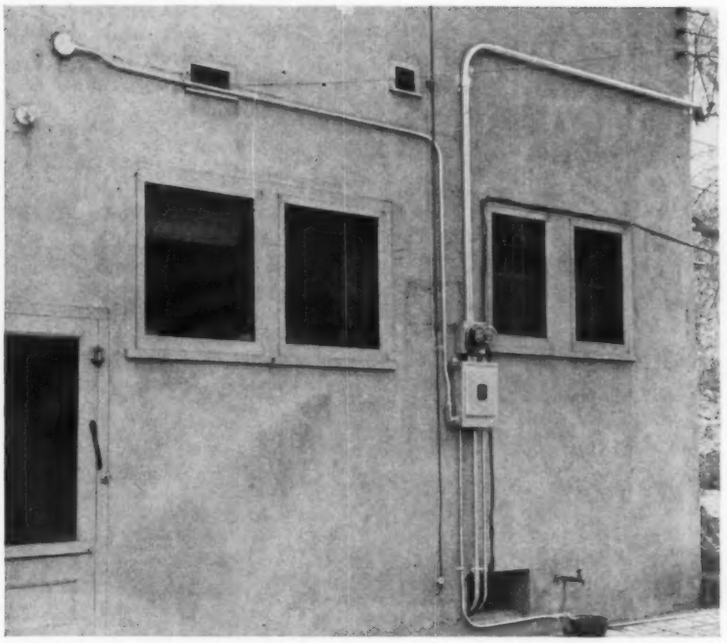
With these layouts it is anticipated that there will be no recesses, meter cabinets or special framing. All equipment is standard and immediately available in every locality. All parts can be installed flush in a 4" wall, requiring no furring or other special construction. The No. 3 installation, wherever the utility still requires a current coil cabinet for residential loads of 160 amp. is an exception. Los Angeles Bureau of Power & Light permits self contained metering of residential loads up to 200 amp. In that territory the current coil cabinet could be eliminated and cost reduced accordingly.

The installation, finally, is simple, compact, has maximum eye value, besides being theft-proof and fool- and trouble-proof. Its cost, estimated on current resale market prices and NECA labor units, with labor at $1.00 per hr., 3.7% social security and state unemployment taxes, sales tax and a 30% markup on prime cost, for an average 6 ft. service run and 10 ft. ground run, would be about $36 for No. 0, $40 for No. 1, $72 for No. 2, and $95 for No. 3. (In Los Angeles $80). While these figures, says Rowley, will not satisfy some contractors, they will more than satisfy many, and at least give a basis for actual local figures.

The difference in first cost between this and a minimum installation may seem high, but it is far less expensive to sell this first cost than to sell the increased service equipment cost on top of every major appliance in the future, and to offer a disfigured house, with old fashioned "outside plumbing" as a penalty for electrical modernity inside.

In each of the layouts the service equipment is simplified to sequence metering without a main switch, using circuit-breakers in an assembly to represent "not over six subdivisions of load," in accord with the National Electrical Code. Conductors in each case may originally be installed of smaller size than maximum, but to increase conductors for full capacity in no case will require replacement of service entrance raceway. Likewise the spare space in the circuit-breaker cans are shown to indicate that where it is desired to keep the original cost as low as possible, the installation still provides raceway and cabinet capacity for future needs.

Next steps to be taken include several things: Meetings with the Red Seal and Adequate Wiring Standards committees to consider incorporation of the services into those standards; presentation of the idea to the sales forces of the industry to win their support; making up demonstration units to present to contractors, inspectors and architects; advertising in trade magazines of the building industry, the building pages of Sunday papers, home magazines, etc.; printing of copies of the layouts to make them available to architects, builders, tract developers; presentation of the plan to FHA, banks and loaning institutions; and incorporation as a supplemental part of the promotional work of Red Seal and Adequate Wiring campaigns.



Outside plumbing was outlawed years ago. At best, outside service equipment is no beautifier of a home. Standardization of service would eliminate much of this

"Whenever an electric range or water heater is installed," says J. H. Pengilly, chairman of the new committee working on this phase of the program, "under old standards of service capacity, it is almost always necessary to increase the service capacity. In the South, the Southern California Edison Co., cities of Pasadena, Riverside and Los Angeles customarily do this by having installed a standard multi-breaker assembly. In most cases the utility assumes all or a large portion of the wiring cost. Several thousand services are being increased every year at a cost to the utilities well up in the hundreds of thousands.

"In addition is the sad fact that many thousands of new houses are being built each year with a similar bottleneck of inadequate service entrance equipment.

"The standardized service is the only solution offered up to the present time. It makes possible, at a very moderate cost, provision for additional electrical utilization at any future time. In view of the heavy cost of changing old services it would appear wise for the industry, especially utilities, to do everything possible, give all possible publicity to such a program as this."

The bottleneck need not be broken, with consequent damage to the bottle, if the neck is blown large enough at first.

Editor's Note—Results of a survey of the present acceptance of circuit-breaker assemblies for ranges and water heater service increases in Western cities, not yet completed, will be made known next issue. Simplification of service equipment, from first indications, seems to be a trend, of which the standardized service plan is a logical goal.

ALEA Program

A specification-certification program covering the design and lighting performance of all types of residential lighting fixtures, incorporating IES's "Recommended Practice for the Illumination Performance of Residential Ceiling Luminaires", and utilizing the inspection and certification services of the Electrical Testing Laboratories, has been adopted by the American Lighting Equipment Assn.

The program marks the first effort of the residential lighting fixture industry to produce and market certified fixtures that comply with authoritative design and illumination specifications identified as such to the public by means of a certification tag. It is expected to effect a noteworthy contribution to residential lighting service, since it will mean that the public may have quality fixtures whose design and lighting performance are certified as representing the best of current thought and practice.

New Shop— New Ideas

1

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BUILD a brand new shop building and you'll put into it new ideas you've long wanted to try. Theo. L. Rosenberg, industrial electrical contractor, celebrated his 15th year in business by opening a new plant at 372 Fifth St., Oakland, recently. Better efficiency, less waste resulted from some of the ideas pictured here.

1. Panels with five 60-watt lamps covered by opal glass, 1800 watts total, give Theo Rosenberg 25 ft. candles on his desk and eliminate the impression of low ceiling.

2. Stockroom shelves are arranged with ½" materials on one level, ¾" on the next, etc. This speeds pickup for delivery to the job. The system is standardized.

3. Cable stock is kept on the large second floor where the floor is marked off in feet for measurement while taking from the reel. Cable is delivered to the job cut to length.

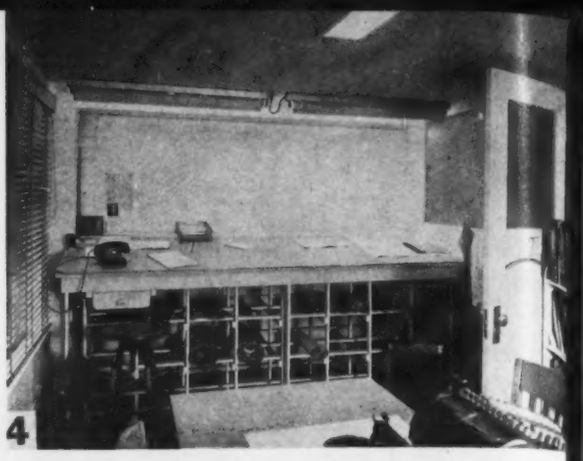
4. Office of engineering salesmen and estimator. Flush panel light for general illumination, two fluorescent strips over the drawing board which has blueprint racks built underneath.

5. Instead of customary pegs which bury short coils of wire, these wire bins make the short lengths, tagged as to length, quickly available and promote economy.

6. Steel legal files prove a compact means of stocking motor and control parts. Subdivided for small parts, these files are large enough to take bigger parts, too. Labels and sometimes samples are affixed to the outside. Brush stock at the right.

7. A real idea for short lengths of flexible steel conduit or armored cable not long enough to coil—horizontal bins. The length can be told at a glance or measured in the bin. Promotes the use of such material instead of wasting it.

8. Make-up bins just outside the stock-room into which the materials for separate jobs are assembled ready for pick-up and delivery—a time saving idea. Prevents mixing of materials for various jobs and permits quick check. Ladder rack is on the top. Below at left is a steel chest in which portable tools, small materials, fittings, etc., are sent and kept at the job.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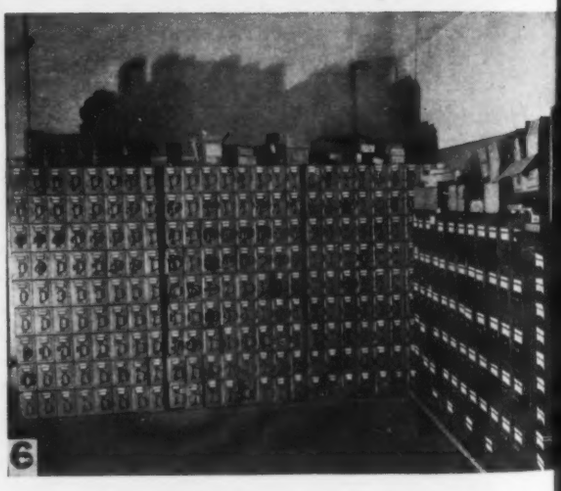
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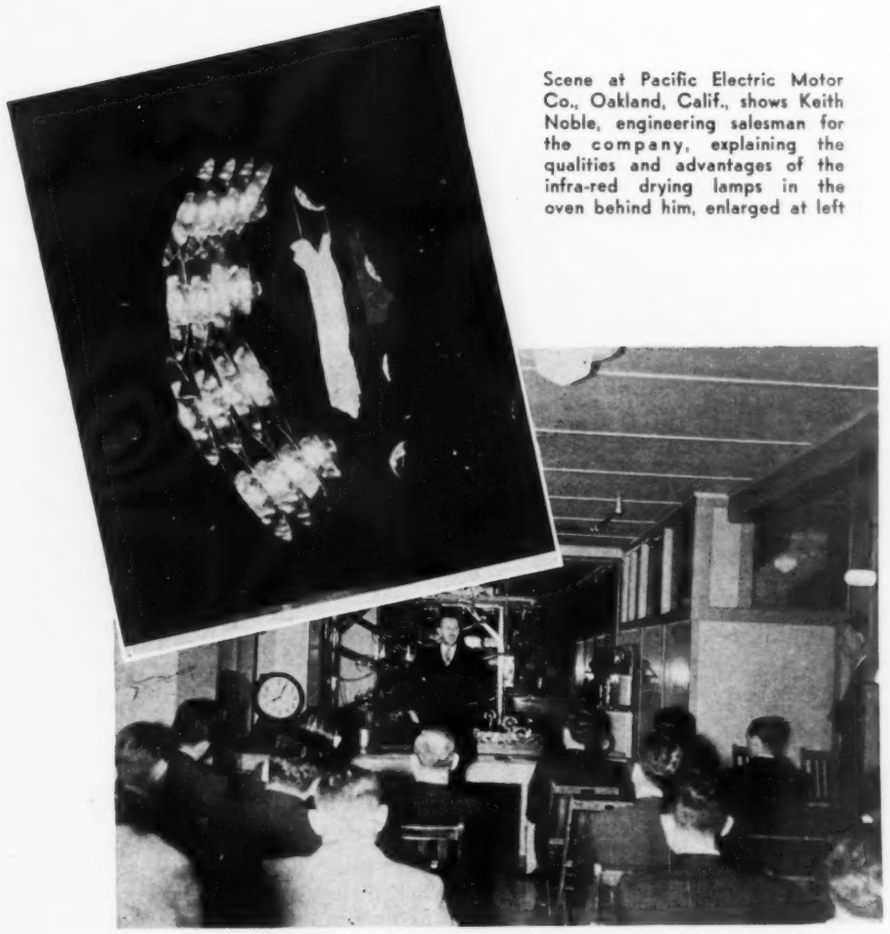
Quick-Drying Infra-Red



Scene at Pacific Electric Motor Co., Oakland, Calif., shows Keith Noble, engineering salesman for the company, explaining the qualities and advantages of the infra-red drying lamps in the oven behind him, enlarged at left

INFRA-RED drying and baking really creates interest. Pacific Electric Motor Co., Oakland, knows that definitely as a result of a series of lecture demonstrations at its showrooms, both afternoon and evening, June 18-20. Now it is busy following up on the interest created at the well attended demonstrations it held.

Invitations were sent to all plant superintendents, maintenance engineers, production managers and executives of industrial plants in the Oakland-Alameda and East Bay industrial section by F. E. Boyd, vice president and manager. Response was unusually good, indicating a keen interest in this new process for quick drying. Attendance averaged 30, the capacity of the showroom, at each showing, and by means of attendance cards signed by those attending, it was found that the groups attending represented important business leads in all fields of industry.

A short yet thorough talk on the possibilities and methods of using infra-red radiation for quick drying, was given by Keith Noble, engineering salesman for Pacific Electric Motor Co. This was followed by a demonstration of paint and enamel drying in a demonstration oven erected in the showroom and visible from the street as well. E. D. Newfield, western division manager, The Fostoria Pressed Steel Corp., and Ray Longmore, of Marwood Co., factory representatives, were present to assist in the demonstration and to answer the questions put forth.

The demonstration equipment has been kept in the display room since the demonstrations so that individual demonstrations can be given to prospects by the sales staff of this contractor's organization. A follow-up is now being made of all prospects and a number of installations of equipment are in immediate prospect, according to Walter Vance, president of Pacific Electric Motor Co. It was also beneficial to his firm, he feels, to bring these plant executives to his showrooms and shop and show them other industrial electrical equipment on display—lighting and control apparatus, etc.—and to let them see the shop equipment and lighting used by the host in its own service business to industrials.

Fluorescent Policy

P G and E states position in flourescent field

Since the comparatively recent introduction of gaseous light sources, there has been some confusion as to the policy of PG and E concerning the acceptance of these new sources. To clarify the company's position on fluorescent lighting, its policy is herewith presented.

1. To encourage every sound technical development of such light sources as well as the art of their application where their use results in a better service or otherwise offers advantages to the customer.
2. Power factor correction is generally recognized to be in the public interest and correction to 90% or more will continue to be required.
3. Sodium and high pressure mercury vapor light sources are especially suitable for highway lighting and certain industrial applications where the color characteristics are not objectionable. These sources will be recommended optionally with incandescent for those applications but in accordance with previously outlined Street Lighting Policy.
4. Fluorescent sources are particularly adapted to commercial application for general illumination, decorative effects and where color matching is essential. Properly fixtured and controlled, they provide a highly efficient and satisfactory light source and have decided advantages in solving certain lighting problems.
5. The overall cost of light from these sources should in all cases be fairly presented to the customer and recommended where it proves to be in his best interest.
6. Uncontrolled and improperly engineered installations of fluorescent including Neon, Zeon, etc., for general illumination should be discouraged as poor lighting practice.
7. Cooperate in every possible way with all manufacturers, jobbers, or contractors who are selling gaseous light sources in properly designed fixtures on an ethical basis. Discourage such use where these sources are not being promoted in the customers' interest or on a constructive basis so far as the industry is concerned.

Adequate Wiring

"All new home construction here in the Northwest should demand a quality of wiring commensurate with the high standard of living in order to maintain that standard," pointed out A. E. Schanuel, field representative of the National Adequate Wiring Bureau, in addressing the Spokane Realty Assn. recently. In discussing "The Value of Certified Wiring to the Realtor," Schanuel mentioned that people in the Northwest are living in an electrical age and have one of the highest standards of living in any section of the country because the kilowatt-hour consumption is more than twice the national average.

Fluorescent School

Electrical League of Utah sponsors Salt Lake Institute

That spectacular infant of the lighting industry—fluorescent lighting—attracted more than 155 industry members from all parts of Utah, and many points in Idaho and Colorado to the Electrical League of Utah's Fluorescent Lighting Institute held June 27 at the Newhouse Hotel in Salt Lake City.

Patterned after similar educational programs being conducted in major cities throughout the country, the conference sought to bring together representatives of all branches of the industry from the territory served by the League for discussion of the common problems and to keep them posted on the latest discoveries and advancements of this new illumination.

The day's activities consisted of an afternoon session with an hour taken for studying the fluorescent exhibits presented by local distributors. A banquet was held and then the evening session got under way.

Verd W. Edwards, lamp representative for the Westinghouse Electric & Mfg. Co., Intermountain district, was chairman of the afternoon session with Ernest L. Dee, Intermountain district representative of the lamp department of General Electric, in charge of the evening session.

Walter E. Potter, lighting engineer of the General Electric office at Portland, was principal speaker at both sessions. He presented the subjects, "Fluorescent Luminaire Design," Fluorescent Lamp Installations," and "The Future of Fluorescent Lighting."

Other speakers were Orson John Hyde, League president, who extended an official welcome; A. E. Evans, the Salt Lake Hardware Co., "History of Artificial Light"; C. E. Kirkpatrick, Graybar Electric Co., "Fluorescent Lamps and Their Operation"; D. H. Hutchinson, Utah Power & Light Co., "Power Factor and Its Relation to Fluorescent Lighting"; F. E. Young, Jr., Westinghouse Electric Supply Co., "Fluorescent Operating and Service Problems"; James C. Littlefield, Utah Power & Light Co., "General Principles of Illumination Design."

An attractively bound reference book was prepared by the League and presented to representatives of each firm. It contained ten sections, first seven of which were composed of abstracts of the lectures given. The last three contained latest technical information on the design, operating characteristics and application of fluorescent equipment.

Education

More flourescent schooling in all-day session in S. F.

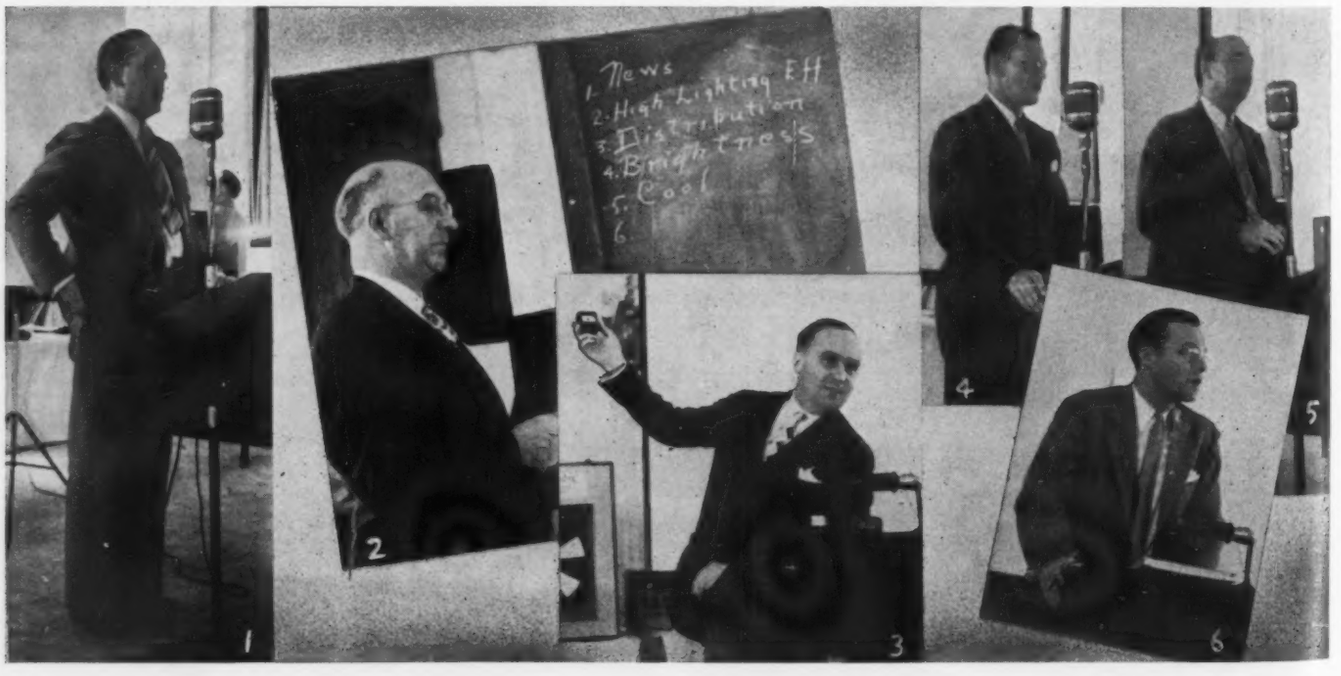
Principles and business possibilities of fluorescent lighting were thoroughly discussed at an all-day lighting school held in San Francisco, June 27, under the sponsorship of the Northern Division, Pacific Coast Electrical Bureau. Contractors, maintenance men, wholesalers, salesman and utility lighting salesmen numbering 235 attended and listened to presentations from a dozen experts directed by Dr. Leland H. Brown of the electrical engineering department of Stanford University, who prepared the curriculum.

Subject matter ranged from an explanation of the position of the utility as regards fluorescent lighting to a discussion of the economics of fluorescent as compared with other types of installations. H. N. Carroll, PG and E, speaking for the utilities, declared that the power companies recognize fluorescent lighting as a great opportunity for the whole industry and agree that when properly installed to meet the best interests of the customer, this new light source is also in the interest of the utility.

Principles of fluorescent lighting and characteristics of the tubes available were discussed by Fred Wellhouse, Westinghouse Lamp Dept., and Sam Hazelton, Jr., General Electric Lamp Dept., who showed that this new source produces efficient, cool, flexible lighting. Auxiliaries and their functions were described by Walter T. Scott, General Electric Co. while the reasons for requiring power factor correction, namely to assure that the customer gets all that he pays for, were brought out by John Koontz, PG and E engineer.

Design and installation problems occupied half a day. Dr. Brown of Stan-

Profiles taken at the Fluorescent Lighting Institute in Salt Lake City show: 1. Verd Edwards, Westinghouse Lamp division, presiding at one meeting; 2. Ernest L. Dee, G-E Lamp Dept., another chairman; 3. Walter E. Potter, lighting engineer, G-E, Portland, a pirncipal speaker; 4. C. E. Kirkpatrick, Graybar, Salt Lake; 5. Frank E. Young, Jr., Westinghouse Supply, Salt Lake; 6. D. H. Hutchinson, manager industrial sales, Utah Power, chairman Institute committee



ford covered luminaire design, pointing out some of the difficulties that were overcome in achieving proper control of fluorescent. Carl Martin of Benjamin Elec. & Mfg. Co., John Erikson of Curtis Lighting and A. T. Bergeron of Miller Co., demonstrated the new types of luminaires and discussed their applications. Installation problems involving wiring were discussed by Ralph Wiley. chief of the San Francisco Electrical Dept., who brought out the fact that the 1940 NEC was drafted before fluorescent lighting was popularized and hence local inspection agencies have been forced to draft regulations. Leonard Hobbs, Smoot-Holman Co., demonstrated the method of calculating lighting installations using the lumen method, and Clark Baker, Northern California Sight Conservation Council, gave a discussion of the quality of lighting required for various seeing tasks.

W. P. Bear, PG and E, presented a simple and exact method of determining the overall cost of fluorescent and other types of lighting and brought out their advantages and disadvantages.

PCEB's Northern Division all-day fluorescent lighting school held recently at the San Francisco Merchandise Mart had this imposing "faculty": (left to right) George C. Tenney, ELECTRICAL WEST; Leonard Hobbs, Smoot-Holman; Clark Baker, PCEB; John Erikson, Curtis Lighting; W. P. Beer, PG and E; W. T. Scott, G-E; A. T. Bergeron, Miller Co., Sam Hazleton, Jr., G-E Lamp Dept.; Dr. Leland Brown, Stanford Univ.; H. N. Carroll, PG and E; John Koontz, PG and E; Ralph Wiley, Dept. of Electricity, S. F.; and Carl Martin, Benjamin Electric & Mfg. Co.

Standard Oil Rewires 28-Story Building in San Francisco

CHANGE over to the 3-phase 4-wire distribution system, and additions to feeder capacity made it possible to increase the entire lighting of the 28-story Standard Oil building in San Francisco from a previous maximum of 5 to 8 ft.-candles up to a present average of 28 to 30, according to H. C. Reid, electrical contractor who has just completed the work. The Standard Oil Co.'s modernization program of its two buildings on Bush St. has been a consistent one carried on over the past two years. The old building at 200 Bush St. was completed in 1938. The new building has now also been completely relighted and its electrical capacity greatly increased.

When H. C. Reid Co. finished the wiring of the original job in 1922, it was considered one of the most adequately wired and lighted office buildings in the city. Lighting then was done by means of luminous bowl fixtures lamped with 100-watt lamps. Later the wattage was increased to 200 watts in the original luminous bowls but during the years the demand for more lighting had brought about an influx of desk lamps and auxiliary lighting equipment which the management finally decided to eliminate by a complete relighting job.

The contractor was able to do so without abandoning any of the original electrical equipment and by adding a minimum of new equipment to supplement it. The 2-wire 1000 volt circuits were replaced by 3 phase 4-wire secondary circuiting which gave 3 circuits in the same conduit where there had been two before; three 1500-watt circuits instead of two 1,000-watt circuits before. Thin wall wire was only necessary in two short runs, the original conduit being large enough to accommodate the 4 wires. Original circuiting was used and supplemented by flexible steel conduit in the furring above the ceiling where necessary. Location of outlets was greatly rearranged to fit new office space arrangement, roughly on 10-ft. centers. Feeder capacity was installed to take care of 500-watt lamps although the present fixtures, totally indirect Smoot-Holman porcelain enamel fixtures, are lamped at 300 watts. Wattage was raised per floor to 6½ watts per sq. ft.

A new switchboard was installed in the basement with bus connections to the new network system of the Pacific Gas and Electric Co. in its transformer vault in the street. From this new switchboard, feeders were run to the old switchboard. Then the busing on the old board was sectionalized and cut over to operate on the new network distribution.

The new switchboard not only fed the old board but became a starting point for eight 4-wire feeders of 5 and 600,000 circ. mil. cables. The original feeders from the original board were kept in service. The single phase feeders fed three floors originally. Now they were changed over to feed one floor, the load being balanced on each feeder at the switchboard. The new feeders took care of the floors cut off from the original feeder system.

After finishing the 200 Bush St. Building, work on the 225 Bush building was held up almost a year because of the double-time limitation required by the local union for a night shift. Union leadership then recognized that it was good business for its members to make provision for shift work under special conditions and work was carried on in the offices on a three shift basis to everyone's satisfaction. The contractor reports that the union electricians carried on the work with responsibility and special care for cleanliness and that none of the office activities in the building were interrupted during the change-over. Neither was the building damaged because of electrical work, the only muss being caused by changing of partitions or rearranging of departments.

The total load in the building is now carried over a 6,000-amp. main switch. The electrical job approximated $100,000. Beside the relighting it involved increases in wiring in the blueprinting and photostat department and other increases in capacity.

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Wendell L. Willkie

IN MAGAZINES such as ELECTRICAL WEST the discussion of partisan politics is generally taboo. However, the forthcoming presidential election, in our opinion, presents issues that are above party—issues that involve more than membership or support of a group that calls itself Republican or Democratic.

Among the issues that have already appeared in the partisan campaigning are charges that Mr. Willkie is a candidate of the utilities, that his sympathies are against government in the power business, that he is not a liberal, that he is a Wall St. corporation man. These statements alone are sufficient justification for a strong defense in Mr. Willkie's behalf and a superhuman effort to elect him on the part of the whole electrical industry. Why? Because such an attack on him is an attack on the industry.

But there are other reasons that lead us to contend that Mr. Willkie should be elected next November. The basic problems confronting this nation are twofold: (1) the imperative necessity for arming for defense against any possible foe or combination of foes; and (2) the restoration of economic recovery and prosperity that will to some degree help in paying for that armament, and at the same time give the people progress and security.

This being the case, then it would appear that the fundamental issue of the campaign is to select the man who, if elected, will do the most efficient job of providing national defense and who will at the same time follow policies that will encourage and revive business and industry.

On the record, we think that Mr. Willkie would accomplish both of these ends better than any other candidate.

Bonneville Emphasis

EXAMINATION of Bonneville's records of sales for the first six months of 1940 should tend to put the emphasis where it properly belongs — namely that sound operating policy should dictate closer cooperation with the private utilities of the Northwest. Up to June of this year the Bonneville Administration sold 72,645,070 kw.-hr. Of this amount of power 68,708,544 kw.-hr., or 94.6 per cent was bought by the Portland General Electric Co. In terms of dollars Portland General Electric paid Bonneville $149,708.72 as against $9,870.41 paid by the four municipally or publicly operated customers of the project. Thus PGE paid in 93.7 per cent of the total income of the project.

Under such circumstances it would appear that solely from the standpoint of sound business, a whole lot of the publicity and propaganda put out about Cascade Locks, Canby, Forest Grove and Skamania PUD has been just so much smoke. If the taxpayers of the United States are ever to get back their normal investments in this project, the money won't come from such operations as those. As a matter of fact if sound business principles dictated the sales strategy of the Bonneville staff, a whole lot less emphasis would be placed upon municipal or publicly owned projects and a whole lot more on the kind of customers who can use and pay for Bonneville power—the private utilities and the potential industrial customers. If we were in the habit of making wagers in these columns, we would offer this one: That the total sales expense (including publicity) properly chargeable to developing publicly owned users for Bonneville power far and away exceeds the total revenues thus far derived from this class of customer.

Backward Berkeley

NOT long ago a member of the electrical industry who lives in Berkeley decided to remodel his home, putting in a complete electrical kitchen. He applied for a building permit—and thereupon discovered that electric disposal units are illegal in that city under a law passed a year or two ago which forbids the depositing of kitchen waste material in the sewers. Apparently the city building inspector was the only one who protested its passing.

There is of course a good deal that could be written about the backwardness and shortsightedness of a University city which brands itself as definitely behind the times, but that is not the immediate concern of the electrical industry. What the industry ought to know is how many other cities have similar ordinances and why they were passed without vigorous protests. Manufacturers and dealers may have thought that the few sales that might be made in Berkeley are unimportant and not worth a fight to keep such an ordinance from passing. However, the effect of such a law goes far beyond that. The housewife who discovers that a presumably enlightened university town thinks the electric sink is too dangerous to be allowed within its limits, does not stop to investigate and learn why. She does not know that the city operates its own garbage collection department and apparently considers it important not to lose clients, whatever means be necessary to keep them. Instead she immediately begins to doubt the statements of the manufacturers of such equipment. She passes this doubt along to her friends, who are apt to spread the disaffection.

The electrical industry still has time to make a stand and correct the condition. City ordinances can be rescinded—and certainly an effort should be made to see that this injustice to both householders and electrical merchants is remedied. Also it would be well to determine if other cities are as backward.

Defense Construction

HASTE made waste in the last war. Haste and inexperience may make waste in the new defense program just as it did in 1917-18. Our already costly program may cost more than it need to—which is to say that we may get less defense preparation than we are paying for if present trends continue.

One example involving construction work that vitally affects the electrical contracting branch of this industry, is to be found in the manner in which big construction contracts are being let in the present emergency. Contracts are being issued on a cost-plus-fixed-fee basis to principal or general contractors without provision for paying a fee or profit to specialty sub-contractors who are not parties to the agreement with the United States. Such sub-contractors cannot be expected to do the work for their costs alone. The situation is causing general contractors to set up electrical departments of their own to include under their own cost-plus-fee. In organizing such departments they ignore the greater efficiency and economy of the highly specialized sub-contractors and substitute therefor a more costly and less efficient organization of their own.

Experience in the last World War and with the Emergency Fleet Corp. contracts proved that such a system has no strict regard for costs, and does not limit the total cost to the government. Investigation showed that the public paid scandalously padded prices for war preparation.

In the present emergency the excuse of speed and centralized organization is not valid for such an oversight. The government is ignoring the practical experience of the shrewdest buyers of construction work—private industry, which puts a check on costs by getting contracts with definite limits as to both time and expense.

Let's get our money's worth for this costly and necessary expenditure by using the experience of the past to guide us—the experience of skilled organizations to expedite the work.

Inspectors Have a Problem

SIMULTANEOUSLY with the release of the much-discussed 1940 edition of the National Electrical Code, inspectors of the Northwest and Southwest will meet this month at Great Falls and Santa Barbara for their annual conventions.

Early indications are that the new wire and conduit tables will be the objects of greatest concern, not because their engineering soundness is open to question, but because of the introduction of more problems of practical enforcement. Rightfully the new code has recognized new engineering facts as to the behavior of wire under varying conditions of temperature.

Where the argument may start, as inspectors experienced in the deviousness of human nature well know, is in determining what the temperature is likely to be and when it is likely to occur. This is apt to be aggravated by the practical wireman's innate resistance to change. Up to now, they have had but six types of wire to worry about in previous codes; the new code lists 19, each with its own characteristics and limitations. In his role as buffer between the manufacturing and installing branches of the industry, the inspector has a real responsibility. On the one hand, he recognizes the engineering soundness of the code. On the other he realizes that the subject of ambient temperature, at least in regions of great temperature variations, is charged with potential argument. It is his ticklish job to bridge the gap between the practical individualism of the contractor and the engineering forces back of the code and keep everyone happy.

Convention programs do not always indicate the real reason why everyone should attend. This year it is more important than ever that every inspector go to these conventions. Only by mutual discussions will it be possible to work out some sensible plan for determining what ambient temperatures are and how to enforce the new code provisions in a uniform manner.

Celebration

Rocky Mt. League joins with New Mexico in anniversary fete

The Rocky Mountain Electrical League is officially joining with the State of New Mexico this year to celebrate the 400th anniversary of Francisco Vasquez de Coronado's explorations and discoveries in that area, in 1540. Within sight of the first winter camp established by the famous explorer (now known as Bernalillo) the League, on September 9, at Albuquerque, will open a three-day convention, the delegates to which will materially swell the attendance of the various anniversary celebrations throughout the state.

In response to a colorful and appealing official invitation bearing a striking illustration of the great Spanish crusader and his followers, and announcing the Coronado Cuarto Centennial and the 1940 Grand Council of the League, representatives of the electrical industry in 22 states already have made

PRAGER

reservations or otherwise signified their intention of being present at the gathering. The invitations, each inscribed with the names of those to whom they are addressed, bear the signatures of League President H. E. Samson, Roswell, New Mexico; Convention Chairman Arthur Prager, Albuquerque, and Mayor Clyde Tingley of Albuquerque.

A dozen subjects of vital import to all branches of the industry will be discussed in special sessions set aside for them or by speakers of national repute, according to convention chairman Prager. These will include adequate wiring, fluorescent lighting, street and highway lighting, kitchen modernizing, engineering and accounting.

Lighting and decorative features unique in the history of such a gathering, forming part of the entertainment for the convention, are being arranged. In addition, there will be a colorful

SAMSON

pageant on the night of the League's annual banquet, depicting Coronado's "Entrada."

Name Change

Northern California Electrical Bureau is the new name for the promotional organization in Northern California specifically charged with the work of promoting adequate wiring. It was previously called the Pacific Coast Electrical Bureau, Northern Division, because it was an outgrowth of the previous Pacific Coast Electrical Bureau doing a statewide promotional job under the former Red Seal plan.

New quarters have also been announced at Room 726-728 at 447 Sutter Street. George W. Barker is manager, Walter C. Heston is industrial engineer, and Clark Baker lighting counsellor.

Pot & Kettlers Elect

At the eleventh annual convention of the Associated Pot & Kettle Clubs of America, held June 28-30 at Lake Washington, Seattle, O. M. Tucker, Lipman, Wolfe & Co., Portland, was elected president of the organization, with Harry O. Davis, Savory, Inc., Los Angeles, vice-president, George E. Kelley, Portland General Electric, secretary and Lloyd M. Simons, M. Seller Co., Portland, treasurer.

Officers of the San Francisco Pot & Kettle Club recently elected to 1940-41 posts are Fred C. Wood, president, L. W. Sauer first vice-president; Geo. A. L'Amoreaux, second vice-president; George Koch, third vice-president; Joseph Shoss, Jr., corresponding secretary, succeeding Osgood Murdock; B. H. Daniels, recording secretary, and H. B. Meek, treasurer.

Sight Council

Moss of G-E and Bennett to speak at October Meeting

Frank M. Moss, associate with Dr. Matthew Luckiesh of the Research Department, Lamp Division of General Electric Co. at Nela Park, Cleveland, and Dr. H. E. Bennett, America's foremost authority on seating and posture, from Grand Rapids, Mich., will be the principal experts to be heard at a special meeting of the Sight Conservation Council of Northern California and the Northern California Council for Exceptional Children at International House, Univ. of California, Oct. 27. This announcement was made by Clark Baker, executive secretary of the Sight Conservation Council, San Francisco. The meeting will be an afternoon and evening meeting covering the specific "problems of physical conditioning in the school and home" of children. The afternoon meeting will be addressed by Dr. Bennett who will talk on the problems of posture and of seating. A conference will follow his address at which demonstrations will be made with equipment and materials supplied by the American Seating Co.

The evening meeting beginning with a dinner at 6:30 p. m. will be addressed by F. M. Moss. He will talk on "certain new aspects of the science of seeing." His services are made possible through the courtesy of the G-E Co. After the address, the meeting will adjourn for a symposium on physical conditioning of the child in which both the lighting environment and the seating and the posture are discussed. This will be led by Dr. Virgil Dickson, superintendent of the Berkeley public schools.

Official answers to the eye questions published in ELECTRICAL WEST, Nov. 1939, will be released at that time, it was promised.

Agenda

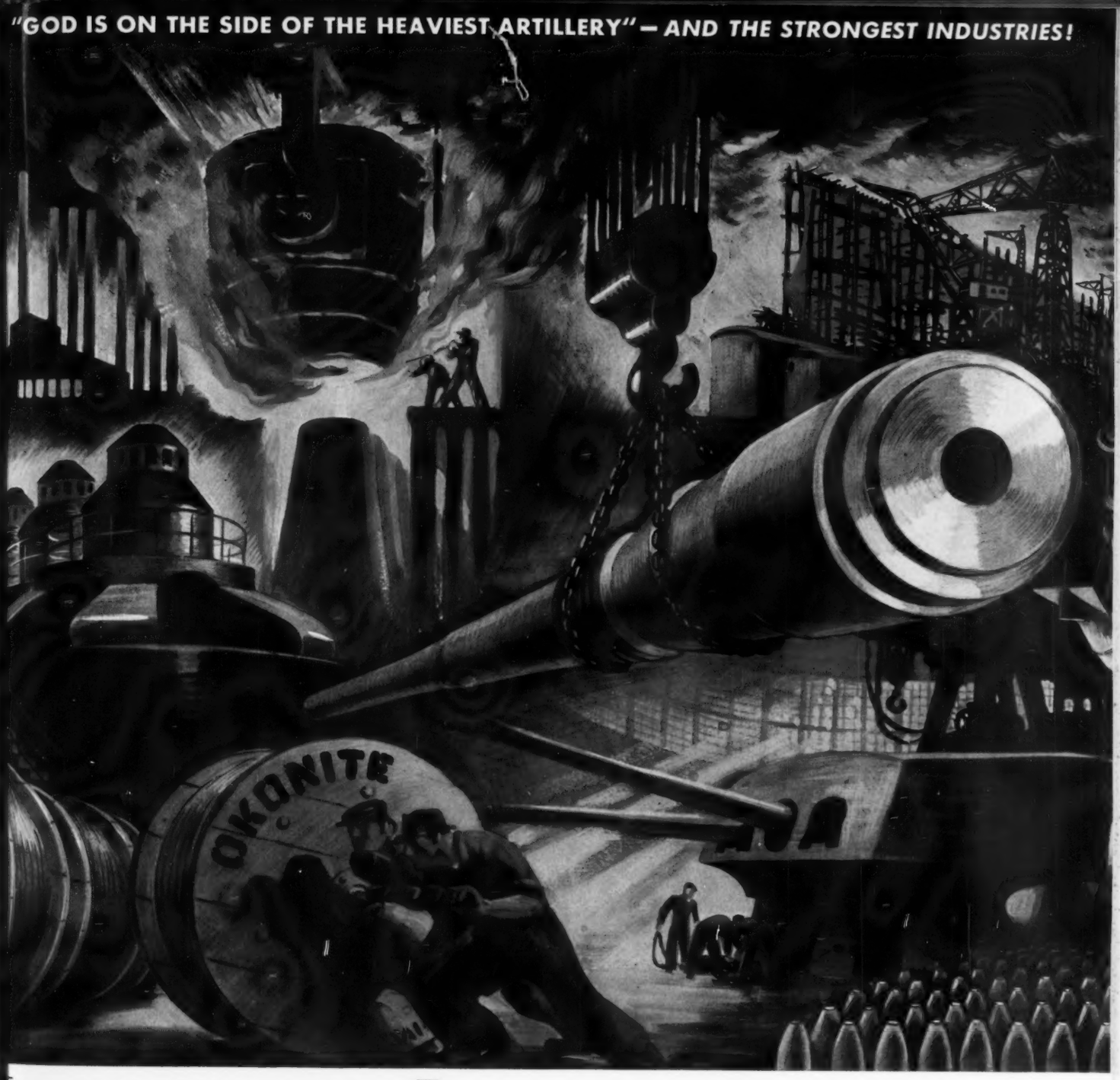
Little activity among leagues in mid-summer

Electric Club of San Diego—Met July 2 to hear John T. Shannon, general manager, Keese Engineering Co., on "Commercial Application of Ultra Violet Radiation." Chairman of the day was A. I. "Benny" Benedict, San Diego Consolidated Gas & Electric Co.

Electric Club of Washington—Met recently at the Arctic Club, where Felix Jones, United Airlines, discussed "Radio Highways of the Air." Club has adjourned for the summer months.

NECA, Santa Barbara Chapter—Meetings held July 11, 25, and August 8. Another is scheduled for August 25. Chapter business was the business of these gatherings.

"GOD IS ON THE SIDE OF THE HEAVIEST ARTILLERY"—AND THE STRONGEST INDUSTRIES!



We reprint this advertisement which first appeared in September, 1938, as an example of our early desire to promote the defense of America.

A NATION'S INDUSTRIES ARE ITS THIRD LINE OF DEFENSE

Armies without a constant stream of supplies are helpless in the field. Navies without material for repairs or munitions are tied to our shores. War today is a war of materials.

Modern wars are waged behind the lines, in the nation's factories. Modern war technique strives to destroy the source of munitions.

When the stream of war supplies is choked off, armies and navies are helpless. Legislation that prevents industrial expansion would affect our defense. Let us protect and encourage our industries to expand now, in time of peace, so that in a time of national emergency they will efficiently provide the sinews of war for our armed forces. The Okonite Co., Passaic, N. J., offices in principal cities.

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IAEI's Two Conventions

Combined convention and vacation invite Northwestern Inspectors to Montana's National Parks, Southwesterners to warm beaches of Santa Barbara

INSPECTORS of the West, accompanied by their associates in the electrical industry interested in wiring, meet in two annual conventions in late August and early September. The new edition of the National Electrical Code, not yet off the presses, will be the center of interest. Northwestern Section inspectors meet far off their usual beaten track, at Great Falls, Montana, Sept. 3-6. Southwestern Section, International Association of Electrical Inspectors, returns to a favorite half way point, Santa Barbara, Calif., Aug. 26-28. Last year both met in joint session in San Francisco in stormy sessions which debated some of the proposed revisions of that same code.

Construction of the two convention programs differs this year in several respects. The Southwestern Section's program is shorter, selects certain more controversial or moot sections of the code and asks experts to talk on them, leaves until next year article-by-article reports on the code so as to permit time for trial and experience.

The Northwestern program is more comprehensive, will include reports from all of its committees, and is relieved each session by one featured address or paper. Montana hospitality promises to furnish the convention with a wide variety of diversion after the sessions adjourn.

The West has two new national vice presidents now, elected by the executive council just recently to fill the vacancies made by the deaths within the last year of Carl Hardy, of Oakland, and H. A. Patton of Seattle. George E. Kimball, electrical engineer, California Accident Commission, San Francisco, was named first vice president; W. L. Gaffney, chief electrical inspector, Tacoma, was made second vice president.

National officers who will appear before both conventions include K. W. Atkins, engineer, Missouri Inspection Bureau, president of IAEI; and Victor H. Tousley, secretary-treasurer, Chicago. The president will present an address; the secretary will discuss changes in the new code. J. W. Whittington, chairman of the Public Relations Committee, will likewise present a report and program for inspectors by which to inform the public as to the value of their work.

Features of the individual convention programs are as follows:

Northwestern Section

Wire holds the spotlight these days. Two of the nation's foremost authorities on wire will discuss it as featured speakers at the Northwestern Section International Assn. of Electrical Inspectors, 14th annual meeting at Great Falls, Montana, Sept. 3-6, according to Blaine Grey, president at Salt Lake City, and F. D. Weber, secretary, Portland.

F. J. Rosch, manager of development and research for Anaconda Wire and Cable Co. of New York City, spectacular speaker and one of the best-informed men on wire characteristics, will talk on "Present and future trends in wire and cable design" at the Thursday afternoon session. Rosch headed a committee of the National Electrical Manufacturers Association whose research on the carrying capacities of wires and cables resulted in the extensive changes made in the National Electrical Code.

"What New Article 300 Means to the Inspector" will be discussed by Howard H. Weber, manager of wire sales U. S. Rubber Products Corp., New York City. As a foremost exponent of the thinwall type of wire and an expert in insulating compounds, no better authority could be found in the country to discuss the importance of the new thin wall wires to the inspector.

The Thursday morning session will have four papers. L. W. Going, Portland, past president, will discuss "Shall the Code recognize special requirements for electric construction in fire zones of cities?" I. B. Sturges, first vice president of the Northwestern Section, also of Portland, will tell of "Eighteen years of Sales Control in Portland." Chief electrical inspector for the state of Oregon, W. R. Volheye, will discuss "Selling Sales Control in the State of Oregon." M. M. Brandon, associate electrical engineer, Underwriters Laboratories, Inc., New York City, will discuss the Laboratories' list of inspected electrical equipment and its use by inspectors in the field.

A newly formed Montana Chapter of the section will be given its charter by President Atkins at the opening session.

Entertainment features of the convention promise to be tops in all respects as the Montana electrical industry shows itself happy to give hospitality to its visitors. All those attending are urged to include in the trip a visit to the nearby Glacier and Yellowstone National Parks whose scenic wonders cannot well be described. The opportunity to do so when all who come must pass close to one or other of the two, is declared to be too special to be missed.

DIXON GREY

Together at last year's joint convention these two presidents preside at this year's two widely separated meetings in the great Pacific West

At Great Falls itself committees headed by H. E. Chambliss, of Montana Power Co. are preparing much. Tuesday afternoon offers a rare sightseeing tour of Black Eagle generating station, Anaconda Copper Mining Co.'s copper and zinc reduction works, and Anaconda Wire & Cable Co.'s wire and rod mill, the source of much of the copper wire used by the industry. Next day there's a trip to Rainbow and Volta plants of Montana Power on the Missouri river, followed by a picnic, barbecue and colorful Indian ceremonies. Dinner dance, golf tournament, theater party and other diversions are on the schedule.

Southwestern Section

Organized to "tell inspectors what they want to know" about certain of the more complicated, newer, or more controversial parts of the code or of new wiring materials and methods, the

Southwestern Section program will not attempt detailed article committee reports, according to James I. Dixon, superintendent of the electrical department, Santa Clara, president, and Harold L. Gerber, chief inspector, San Francisco, secretary-treasurer.

For instance, there will be a speaker on "Fluorescent Lighting," not yet announced, at the first noon luncheon after routine opening welcomes and addresses and reports. Monday afternoon R. H. Manahan, chief of the electrical division, Los Angeles, and past president, as well as member of the Electrical Committee on the code, will lead off with a paper and discussion, "Article 210, Branch Circuits" as outlined in the 1940 Code.

"Increasing loads in existing raceways," another moot issue, will be discussed by Ralph W. Wiley, chief of the department of Electricity, San Francisco, also past president, and a member of the Electrical Committee. "Panelboards and Switchboards" will be treated upon by Ken W. Keene, electrical engineer, Underwriters Laboratories, San Francisco.

Adams to Speak

L. F. Adams, assistant to the vice president, General Electric Co., New York, will talk Tuesday morning on the subject, "Article 250, Grounding," explaining the changes in rules on that perennial topic. "Circuit Breakers and Multi-breakers, their characteristics and applications," will be told by O. E. Keeler, switchboard engineer, Westinghouse, San Francisco.

A demonstration and paper on "Resistance measurements and insulation testing," will be presented by James S. Mahan, consultant, Chicago. "Fluorescent Lighting and Auxiliaries" will be discussed from the wiring and inspection standpoint by R. E. Baer, G-E Co., Los Angeles. G. E. Price, Orange county electrical inspector, Santa Ana, will cover a study he has made of "Hazardous Locations."

Ben C. Hill, superintendent of the electrical department, Oakland, and another member of the Electrical Committee, will discuss "Article 66, Special Equipment, Signs and Outline Lighting" at Wednesday morning's session. Another Hill, H. C. Hill, G-E Co., Los Angeles, will give a paper, "The New Motor Requirements relative to Type Markings." Still on motors, A. E. Riche, vice president, Micro-Switch Corp., Freeport, Ill., will give an illustrated talk on "The Inherent Overheating Protection of Fractional Horsepower Motors." George E. Kimball, electrical engineer, Industrial Accident Commission, will discuss, "Working Spaces and Guarding," of particular interest in industrial wiring.

Wednesday afternoon will close with a final business session and the Clearing House Committee report by Manahan. Code breakfasts will be chairmaned by Ben Hill on Tuesday, W. J. Tretheway of Huntington Park, on Wednesday.

Entertainment

Entertainment will include a luncheon on Monday noon, and a barbecue dinner on the beach in the evening. Tuesday afternoon will be devoted to either a sightseeing tour about Santa Barbara or to golf. Tuesday evening the annual dinner dance will include the customary stunt which makes fun of some aspect of codes or inspection. Harry V. Dobson, city inspector, Santa Barbara, is chairman of the convention arrangements committee. The convention hotel is the Miramar, at Montecito, just south of Santa Barbara on highway No. 101.

● AN INFORMAL LUNCHEON is being held every other Friday by the Seattle Electrical Contractors Assn. These gatherings at the Frye Hotel are being held independently of the Electric Club of Washington, which has suspended its luncheon meetings until September.

Automatic Protection against Flow Line SURGE

PELTON automatic surge suppressors open immediately as pump motors are stopped and are in drain position before the check valves have closed to stop reverse flow. As the resulting surge is relieved, automatic closure is effected as rapidly as flow line conditions permit. These suppressors likewise function to relieve excess pressure produced by any means other than power interruption. Resetting is automatic after normal conditions are restored.

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NEWS OF THE INDUSTRY

BOULDER DAM RATE REVISION BILL NEARS FULL ADOPTION

Passage by the Senate last month of the House bill providing a revision in Boulder Dam power rates was regarded in Southern California as postive assurance that the legislation will soon become law. It remained only for the House once more to formally adopt the Senate bill which previously had gone through the Lower House and then been sent to a conference committee.

Revision of the power rates as authorized under the bill will effect a savings to the Metropolitan Water District of more than $600,000 annually for the first three years, about $800,000 annually for the following four years, or a total of about $16,000,000 during the life of the District contract, it was stated. This large annual saving to the District will be passed directly on to the taxpayers of Los Angeles and the other twelve cities of the District, it was explained in the offices of the District. In addition, the City of Los Angeles, the other large user of Boulder Dam power, will realize annually savings of like amounts, it was shown.

It was pointed out that the new bill permits the Government to fix Boulder power rates based upon the financial requirements of the Boulder Dam project, while formerly the rates were fixed on a so-called "competitive" basis. The rates charged under the old "competitive" basis. The rates charged under the old "competitive" method were higher than those charged by comparable Government power projects and returned to the Government more revenues than actually were required to meet all financial obligations in connection with the Boulder Dam project.

Power being purchased by the Metropolitan Water District from Boulder Dam is used to operate the five giant pumping plants that raise Colorado River Aqueduct water over mountain barriers standing between the Colorado River and the thirteen cities of the District. Under a contract with the Government, the District will take and use 36 per cent of all firm power generated at Boulder Dam. The District cities that will realize a material benefit through the reduction of power rates made possible by the new legislation are Anaheim, Beverly Hills, Burbank, Compton, Fullerton, Glendale, Long Beach, Los Angeles, Pasadena, San Marino, Santa Ana, Santa Monica, and Torrance.

COW SCRATCHER

A thoughtless cow scratching her back on a guy wire in a field west of Vale, Idaho, recently put all of the Idaho Power Co. rural lines out of commission and caused damage estimated at $1,500 at the power company's transformer station just outside the city's limits. Vibrations caused two high-tension lines carrying 11,000 volts to wrap together and the resulting short circuit fused them. So tremendous was the resulting load that it backed up against the transformer, less than a mile away. There was a loud explosion as the fuses at the station went out and great arcs of fire shot from the station.

Servicemen made temporary repairs and the city lights were off for only seven minutes. Later rural service was restored by way of the Ontario substation.

The cow, of course, was uninjured, and apologized later to utility officials, pleading temporary insanity. "You would have done the same thing," she said, "if your back needed scratching like mine did."

● IMPROVEMENTS and extensions of the Grays Harbor PUD system to cost $30,000, involving ten major units, have been approved by the commissioners, and Robert W. Beck, PUD manager, authorized to proceed with the work. The largest of the improvements planned is construction of new 23,000-volt line from the projected Bonneville substation near Cosmopolis to the transformer bank of the Twin Harbors Electric Co., costing $7,868.51, two and a half miles long.

● AN ORDINANCE to provide a $116,525 appropriation for re-insulation of the Seattle-Tacoma electric power tie line has been ordered by corporation counsel A. C. Van Soelen by the City Council utilities committee, at the request of E. R. Hoffman, City Light superintendent. The project, which will provide new high voltage transformers, is designed to provide greater emergency standby capacity and increased energy transfer between Seattle and Tacoma light plants. Cost of the undertaking will be shared by the two cities.

ICKES REFUSES APPROVAL OF HETCH HETCHY AGREEMENT

Secretary of the Interior Harold Ickes on July 25 refused approval of the tentative agreement between the City of San Francisco and Pacific Gas and Electric Co. for distributing Hetch Hetchy power, but indicated that he would grant the city an additional 60 days' extension from Aug. 1 to work out a plan that would comply with the Raker Act.

Ickes' principal objection to "Plan C" which was submitted to him by Mayor Rossi and other city officials was the clause providing that PG and E employees would distribute the power, solicit applications and contracts for service, read meters, collect bills and maintain the distribution system.

City attorney John O'Toole asked Ickes for more than 60 days in which to work out a satisfactory lease plan, as the Secretary of the Interior declared that 60 days was the limit. Mayor Rossi told Ickes that the clause under question had been included in the proposal because taking PG and E employees under civil service as city employees would deprive these people of social security and retirement benefits.

Ickes declared during the discussion that the plan as presented seemed to be a well decorated agreement complete with "rouge, lipstick, and plucked eyebrows," but minus the essential demands he had made for full compliance with the Raker Act.

★ Refusal to approve the proposed lease agreement still leaves San Francisco in a dilemma that will only be solved by amendment of the Raker Act or absolute public ownership, which the voters refuse to sanction. There is growing speculation as to what might happen if a defiant city official was to "pull the switch" on Hetch Hetchy power.

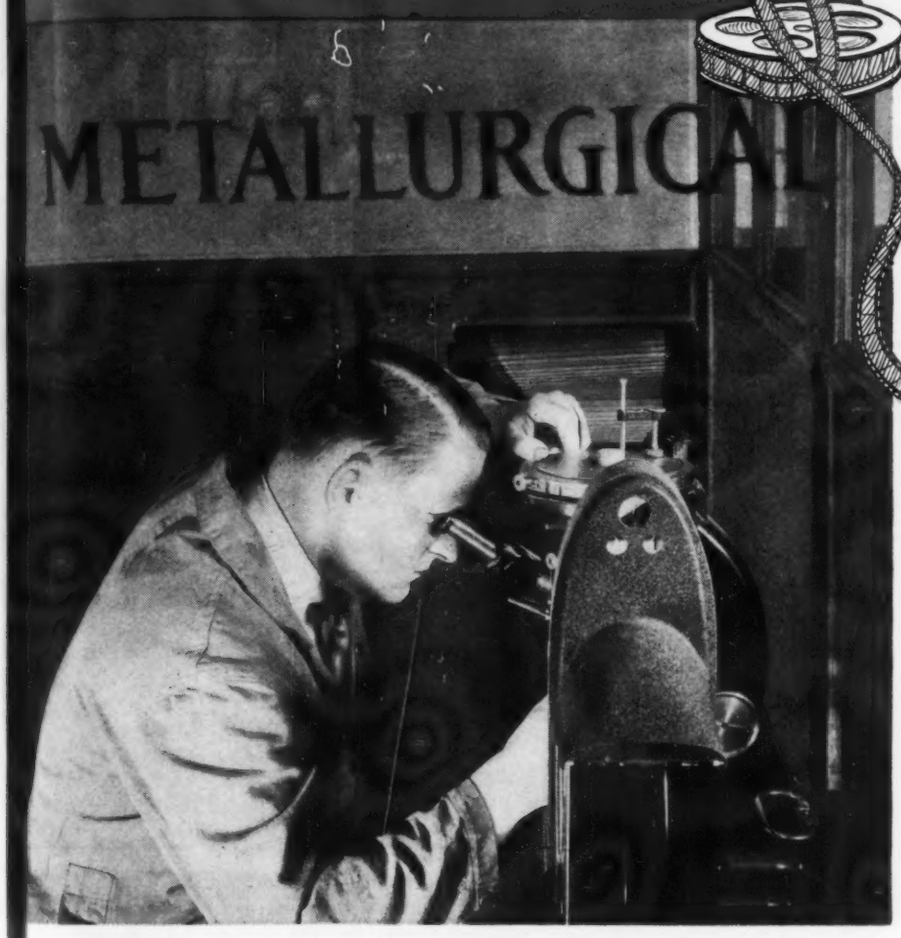
PACIFIC CARBIDE SIGNS BONNEVILLE CONTRACT

Establishment of another basic industry in the Pacific Northwest was made last month with the execution of a contract for the sale of 2,000 kw. of prime power to the Pacific Carbide & Alloys Co. by the Bonneville Administration.

A new corporation and a subsidiary of the Stuart Oxygen Co. of San Francisco, the company plans to establish a plant on a 10-acre tract which the

"SCREEN TESTS"

no Hollywood Star could pass



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The metallographic microscope in Anaconda's studio magnifies samples 3000 diameters...makes possible the detection of heretofore undiscovered flaws and deficiencies in cable materials

IN THIS PHASE of laboratory work, the engineer must have both the trained eye of the casting director and the skill of the make-up artist and cameraman. For, expert preparation of the metal sample is necessary before any revealing secrets will be given up to the observer. Then experience comes to the foreground to interpret what is seen.

These observations, plus the results of numerous physical and chemical tests, are the basis of manufacturing control and development resulting in better products to meet and surpass the new and more strict specifications of the customer.

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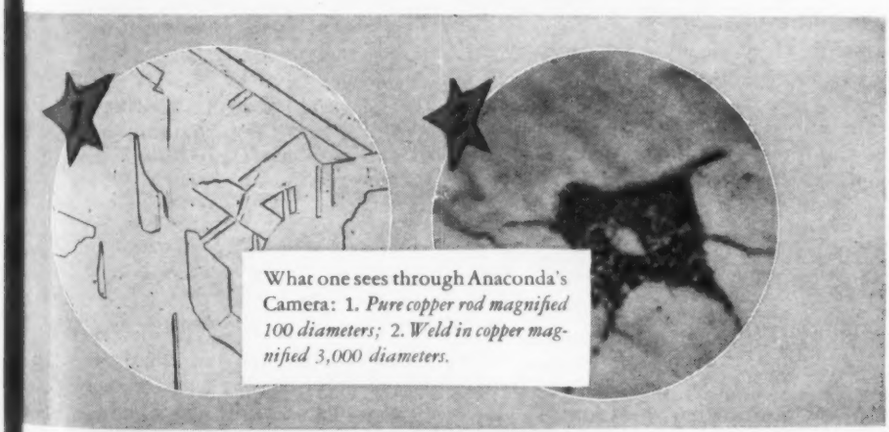

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company has purchased in the St. John's district on the outskirts of Portland, to manufacture calcium carbide to be used by the parent company and others in the manufacture of acetylene gas and other products. The plant will be the first of its kind west of the Mississippi River. At present there are but four companies engaged in the manufacture of carbide in the United States.

Administrator Paul Raver said he had been advised by Patrick Coyne, president of Stuart Oxygen that the carbide plant would probably begin operation next September. Under its contract, Bonneville is called upon to deliver power when the plant is ready for operation.

During a two-year developmental period, the Bonneville contract provides that the minimum demand upon Bonneville will be for 700 kw. For the remaining 18 years, the demand will be increased to at least 2,000 kw. Bonneville power will be delivered to the Pacific Carbide plant temporarily over lines of the Northwestern Electric Co. under terms of an agreement with the utility.

★ Bonneville now has signed three industrial customers Aluminum Co. of America, Sierra Iron Co. and Pacific Carbide. Reports are current that a second aluminum company is negotiating for 50,000 kw.

Oregon Cooperative To Buy Bonneville Power

The Benton-Lincoln Electric Co-operative, Inc., Corvallis, Ore., contracted last month to purchase 300 kw. of prime power from the Bonneville Power Administration.

A 20-year agreement was executed at Bonneville in Portland, by Administrator Paul J. Raver and President George W. Hendricks and Secretary George C. Winters of the Cooperative. The contract was Bonneville's first power sale to a cooperative power distribution agency organized under the direction of the federal government's Rural Electrification Administration. It brought Bonneville's total prime power commitments to a new high of 101,350 kw.

The purchasing group was organized as a project early in 1939 through rural sponsors and county agricultural agents in Lincoln and Benton counties in West Central Oregon. It was originally set up for 150 miles of line and 400 members. Its officials recently filed supplementary applications with REA for additional financing which, if granted, will bring the value of its system to more than $1,000,000, expand its system into neighboring Linn, Polk and Marion counties, and make it one of the few 1000-mile cooperatives in the country.

Bonneville Tie-In With WWP and Northwestern

A three-way contract for inter-tying the transmission systems of Northwestern Electric Co. and The Washington Water Power Co. with Bonneville and Grand Coulee has just been completed, according to Paul J. Raver, Bonneville Administrator. The interconnection is for the stated purpose of taking surplus energy from any one of the three systems available to the others in emergencies. The contract involves no fixed sale of power.

Connection between Northwestern Electric Co. and Bonneville will be as it now exists over the lines of Portland General Electric Co., which are connected with Bonneville at Ampere substation near Vancouver, Wash., and at West Salem, Ore. The two Portland companies have long been inter-connected and have effective inter-change of power agreements in operation. The connection of the system of The Washington Water Power Co. with Bonneville will be made near Stratford, Wash., where the Bonneville - Grand Coulee line crosses that of the Water Power Co. This interconnection will be made initially at 115,000 volts and the interchange contract at that point will expire automatically Sept. 1, 1941, or earlier if it is found that the beginning of operation of the first generating unit at Grand Coulee Dam will require the Coulee line to be operated at 230,000 volts instead of at 115,000.

★ Taxpayers would be saved many millions if more interconnections were made between Bonneville and the private utilities, according to studies which have been made.

Bureau Power & Light Plan Steam Generating Plant

Preparations for prompt construction of a steam generating plant in the Los Angeles Harbor district are under way by the Bureau of Power and Light, following approval by the Board of Water and Power Commissioners of a budget item of approximately $8,000,000 for the project, $2,320,000 of which is budgeted for use in the fiscal year ending June 30, 1941.

The first unit of the plant is a 65,000-kw. steam turbo-generator with single boiler of the high pressure-high temperature type. Design of the plant is based on the unit system and future additions will be made accordingly. Bids on the turbo-generator were to be received July 16. Bids on the boiler are to be received August 15.

It is planned that the initial plant will be placed in operation about December, 1942, at which time it is expected that present generation facilities will be inadequate for the winter peak.

Currently, the municipal electric system has the following power sources, with a total effective capacity of 700,000 kw.:

Boulder hydro-electric	400,000 kw.
Aqueduct hydro-electric	100,000 kw.
Steam plants (2)	140,000 kw.
Leased steam plant unit (So. Cal. Edison)	60,000 kw.

Design of the Harbor Steam Plant has been carried on intensively during the past year under the supervision of H. C. Gardett, who has just been appointed chief electrical engineer and general manager of the Bureau of Power and Light. W. C. Rowse is in direct charge of the steam plant engineering staff. Consultants on the project are Dr. W. F. Durand and A. G. Christie.

PUD Association Asks Bonneville Services

The Puget Sound Utility Commissioners Assn., by unanimous vote, recently requested the services of the Bonneville Power Administration in negotiating and financing the purchase of the Puget Sound Power & Light Co. properties. The vote removed all obstacles to cooperation between the Federal and county power agencies in the Puget Sound area, it is declared. The vote was taken after Allan Hart, legal counsel for Bonneville, had declared that the Government project was setting up a special acquisition unit and was prepared to furnish legal, engineering and financial advice free to the districts if they asked for it.

Hart emphasized that while Bonneville Administrator Paul J. Raver was making these services available, there would be no Federal dictatorship on prices or methods of acquisition.

It was suggested that each district invite the aid of Bonneville to lay the groundwork for negotiating the Puget Sound power purchase. Any contracts effected would be subject to the approval of the individual districts before becoming effective.

★ Meantime condemnation proceedings brought by individual PUD's continue against sections of the Puget Sound system.

● San Francisco and Oakland contractors and unions under indictment were denied dismissal of the case against them by Federal Judge Roche, when he denied the demurrer entered by counsel for the contractors, Walter J. Walsh. Date for pleas was set for July 30. It is likely, according to local opinion, that the case will not be heard until late in the year, possibly after elections.

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KEARNEY TYPE 200 FITALL FUSE LINKS

Kearney Type 200 Fitall Fuse Links are designed to conform with N. E. M. A. manufacturing standards of universal fuse links, Publication No. 38-53, SG9-90 and are easily adaptable for use in other non-standard types of cutouts. They're the latest thing to meet today's and future requirements, modernly packed for efficient handling. Try them on your next order.

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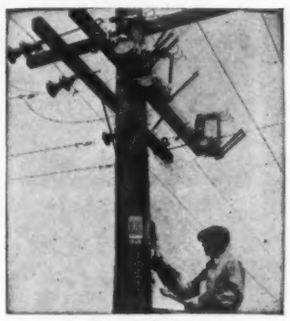
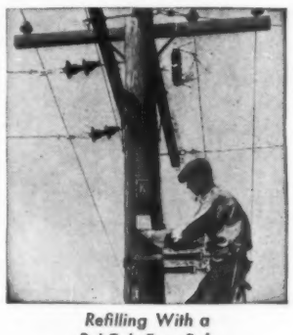
GRAYBAR ELECTRIC CO., Seattle, Portland, Tacoma, Spokane • WESTINGHOUSE ELECTRIC SUPPLY CO., Phoenix • J. R. BRADLEY CO., Reno

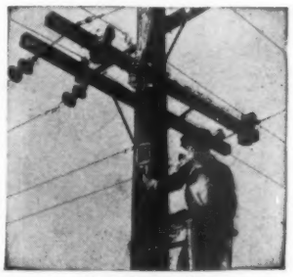
Right Fuse at the Right Place



Fuse-Paks for Reclosing Switches



Refilling With a Pul-Tab Fuse-Pak



Fuse Supply for Indicating Cutouts

Bonneville Conducts Electrification School

That Bonneville Power Administration is facing its responsibilities to bring knowledge of electrical usage as well as electric energy into the Public Utility Districts served for the first time with power by it, was shown in the first electrification school it conducted at Skamania PUD, in Washington not long ago. County agent Gillard conducted it in cooperation with electrical equipment dealers, the state college extension service, the Skamania PUD and Bonneville Administration.

A two day program of educational lectures and demonstrations of equipment was conducted in the local Grange hall. G. H. Bliesner, assistant engineer, Carl Izett and Mr. Buehler of Bonneville presented demonstrations and talks on adequate wiring, refrigeration —household and dairy, and movies, respectively. Miss Esther Pond, home economist of the state college talked on home lighting. A. G. Bergren, Mitchell Lewis & Staver Co..; C. A. Olson, R. M. Wade & Co.; S. A. Sween, Sween's Laying Batteries; Les Beard, Marshall-Wells Co.; George Sargent, Pacific Pumping Co.; P. O. Brandenberger, Liquid Manure Pumps, displayed equipment.

G. H. Bleisner, assistant engineer of the Bonneville Administration, looks over the model electrified farm which is used by him in the newly sponsored Bonneville electrification school. Educational meetings are being held with new customers, and demonstrations of equipment and facilites given by Bleisner and staff. Home economics, household and dairy talks are also offered

Sherman Makes Today's Finest SOLDERLESS LUGS

- Strong and Rigid
- Permanently Tight
- Fully Interchangeable With Soldering Lugs

Type S-O. A heavy lug. Pure Copper. Rigid and sturdy with extra contact area.

Type S-M. Low cost one-piece design. Compact and extra strong. May be soldered if desired. Made of pure copper.

For many years Sherman has led in the production of fine quality Lugs at moderate prices. Today Sherman Lugs are favorably known throughout the industry.

Sherman Solderless Lugs are the result of extensive development work, designed to combine the time-saving convenience of the solderless type with the strength, rigidity and permanence so essential in handling heavy loads. They fully meet every requirement and are interchangeable with corresponding soldering lugs.

Write *For Bulletins 15 and 24, and FREE samples. (Larger sizes sent on memo invoice.)*

H. B. SHERMAN MFG. CO. Battle Creek, Mich.

Electric Energy Production Hits New High for 1940

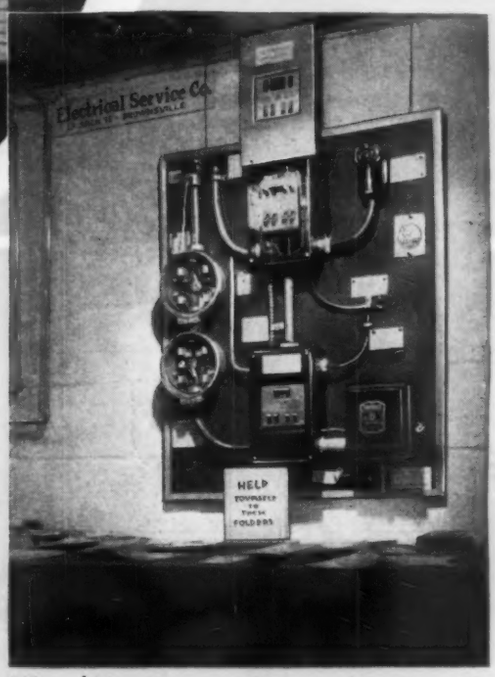
Production of electric energy for public use during May totaled 11,428,552,000 kw.-hrs., the Federal Power Commission reported recently. The average daily production during May was 368,663,000 kw.-hrs., or 0.5 per cent more than the average daily production in April, and was an increase of 12.3 per cent when compared with the same month of the previous year. Production by water power in May amounted to 4,578,836,000 kw.-hrs., or 40 per cent of the total output for public use.

Reports were received during June indicating that the capacity of generating plants in service in the United States on May 31, 1940, totaled 40,646,000 kw. This is a net increase of 90,000 kw. over that previously reported in service on April 30, 1940. Occasionally changes are made in plants which are not reported promptly, so that the figures shown for any one month do not necessarily mean that all the changes were made during that month but only that they were reported to the Commission since the previous monthly report was issued.

Exclusive of international transfers, a total of 2,429,580,000 kw.-hrs. or 21.3 per cent of the total generation was reported as crossing state lines during May, 1940.

This Electrical Contractor Merchandised His Services!

HERBERT MILLER, owner and manager of the Electrical Service Company, Brownsville, Pennsylvania.



(Above) The demonstration panel displayed in the basement of the demonstration home. Notice that **Square D Multi-breakeRs** are a major part of this ideal layout which provides for future as well as today's requirements. Prospective home buyers are quick to appreciate the desirability of Multi-breakeRs which eliminate fuses and the inconvenience of replacing them. They are surprised to learn that they cost little, if any, more than ordinary fusible equipment.

● Here is an example of aggressive selling by an electrical contractor. He said to the builder, "Let's install an ideal electrical job and merchandise it to the thousands of people who will inspect this model home. It will help you sell homes and help me to get more and better wiring jobs." The idea appealed to the builder, so—

Wiring layout and specifications of the highest standards were adopted. A demonstration panel was installed in the basement, showing visitors the exact wiring arrangement. An attendant explained the advantages of adequate wiring—including **SQUARE D MULTI-BREAKERS.**

The contractor got results. In addition to fine publicity, he actually signed up wiring contracts that meant real money. Isn't this an idea you can use profitably?

CALL IN A SQUARE D MAN

SQUARE D COMPANY

LOS ANGELES - MILWAUKEE - DETROIT

IN CANADA: SQUARE D COMPANY CANADA LIMITED, TORONTO, ONTARIO

AIEE Pacific Coast Meet Opens Aug. 27 in Los Angeles

With convention headquarters in Los Angeles this year, the AIEE Pacific Coast gathering will hold forth Aug. 27-30 at the Ambassador Hotel with a program of technical sessions including a special student session, varied inspection trips, and social and sports events.

President-elect R. W. Sorensen will open the conclave on Tuesday morning, Aug. 27 with his subject "Science and Superstition." Douglas Shearer, sound director of Metro-Goldwyn Studios, will also address the delegates that same morning.

The technical conference will deal with governors, frequency control and load swings, with several leading engineers as discussion leaders.

Trips have been arranged to Griffith Planetarium and on Wednesday night, a dinner will be held in the famous Cocoanut Grove, with a golf tourney set for Thursday at the Riviera Country Club. A special women's entertainment program has also been completed.

Chairman of the 1940 convention is N. B. Hinson, with M. A. Sawyer, his assistant, and H. L. Caldwell, vice-chairman, J. M. Gaylord, secretary. J. H. Vivian is in charge of the technical program, and H. W. Warren, entertainment.

TENTATIVE TECHNICAL PROGRAM
(In Part)

TUESDAY, AUGUST 27

10:00 a.m.—Opening Session.
Address of Welcome—Convention Chairman, N. B. Hinson.
Address—"Science & Superstition," President-Elect R. W. Sorensen.
Address—Douglas Shearer, Sound Director, Metro-Goldwyn-Mayer Studios.
2:00 p.m.—Protective Devices.
A. C. Pilot Wire Relaying—O'Connel and Neher.
Displacement and Diffusion in Fluid Flow Circuit Breakers—Slepian.
High Efficiency Interrupter for Oil-Poor Breakers—Baker.
Extension of Relay Carrier Channel to Other Uses—Smith and Goldsborough.

WEDNESDAY, AUGUST 28

9:00 a.m.—Power Transmission and Distribution.
Superposition Methods in Calculating Effects of Additions to Power Systems—Rettig.
Capacitors—Their Effects on Power Factor and Voltage—Butler.
Shielding of Transmission Lines—C. F. Wagnes, G. D. McCann, G. L. Maclane.
9:00 a.m.—Conference on Governors, Frequency Control, Load Swings, etc.
2:00 p.m.—Electrical Machinery.
An Electrical Governor—Morgan.
Insulation Power Factor—Hodtum.
Effect of Sequential Switching on Measurements of Sub-Transient Reactances—F. von Roeschaub.
2:00 p.m.—Instruments, Measurements and Basic Sciences.
Transient Analyses of Completely Transposed Multi-Conductor Transmission Lines—Pipes.
Braking Magnets for Watthour Meters—Kinnard and Goss.

THURSDAY, AUGUST 29

9:00 a.m.—Communication — Joint Session with I.R.E.
Vario-Losser Circuits—Doba and Bennett.
Frequency Modulation—Major E. H. Armstrong.

Two PUDS in Washington Win Court Fight

Decision in favor of public utility district No. 1 of Douglas County and No. 2 of Grant County, Wash., was recently filed by Judge E. W. Schwellenbach in the PUD's suits against The Washington Water Power Co. Rulings of the court stated that both the public utility districts had specified and adopted a sufficient plan under the statute and that the petitioners were entitled to an order of public use and necessity. In these two county cases, the question of taking in territory in adjacent counties, under which Judge T. A. Paul in Okanogan County and Judge F. H. Witt in Lincoln County, was not raised.

After the decision, A. E. Russell, member of the utility's legal staff, indicated that the decision would be appealed to the state supreme court and that a writ of review is to be filed with the supreme court when the formal judgment is received from Judge Schwellenbach.

Contention of the company was that it was not necessary to condemn its franchise because a public utility district doesn't require franchises to operate an electric power business. Court's ruling that the public utility districts were entitled to an order of public use and necessity and hence could condemn the power company's transmission lines in their districts and the company's franchise to maintain poles on streets and highways in the districts.

FPC Orders Public Hearing on Pacific Power Transfer

The Federal Power Commission, upon further consideration of the issues involved pursuant to a recent decision of the United States Circuit Court of Appeals for the Ninth Circuit, has ordered that a public hearing be held September 9, 1940, on the long-pending joint application of Pacific Power & Light Co. and its subsidiary, Inland Power & Light Co., for transfer of all the property, rights, licenses and assets of the Inland company to Pacific.

Included in the proposed transfer are two Inland Power & Light Co. projects which are licensed by the Commission. They are the Ariel Hydroelectric Project located on Lewis River in Washington, and the Wallowa Falls Project located on the Wallowa River in Oregon.

Tacoma Appropriates $170,000 For Seattle Inter-Tie Line

The initial step toward tripling the capacity of the Tacoma-Seattle municipal electric power intertie was taken in Tacoma recently when Utilities Commissioner R. D. O'Neil introduced an ordinance appropriating $170,000 for Tacoma's half of the line. Present capacity is 15,000 k., which will be increased to a maximum of 50,000 kw. and normal exchange capacity of 45,000 kw. nearly twice the capacity of 28,000 kw. of the Bonneville intertie line with Tacoma and Seattle, now under construction. Tacoma's power resources are overloaded, O'Neil said.

According to O'Neil, Tacoma will save around $70,000 in the next two years on power purchases from Seattle's systems rather than from Bonneville. He stated that Seattle's power is available at 2 mills and Bonneville cost 2½ mills per kw.-hr.

Seattle already has done some work on modernizing the 28-mile line and has an ordinance before the city council appropriating $116,000 to continue its share of the work.

WWP Fully Approves City of Spokane Rental Charge

Officials indicated recently that The Washington Power Co. fully approves the one per cent rental charge assessed against it recently by the city of Spokane for use of the streets for its central heating business. The one per cent charge on gross sales of heat with a $2500 annual minimum will require the company to pay on business done since the Central Heating Company's franchise expired April 6, 1939, and the heating company was absorbed by Washington Water Power.

"This new tax will just make it possible for us legally to pay what we would have owed the city if we had had a franchise," Kinsey M. Robinson, president, said. Robinson indicated that his company would soon accede to the city council's request and apply for a new heating franchise.

● PRIVATE UTILITY COMPANIES in the State of Washington have reduced rates during the past six months by $481,670, according to Don G. Abel, Director of Public Service. The largest reduction, he said, was made by the Washington Water Power Co., of Spokane, the total annual reduction being $231,323. The second largest reduction was made by the Puget Sound Power & Light Co., $115,000.

Washington Water Power Studies Power Needs

As its contribution to the emergency national defense program, the Washington Water Power Co. is now making extensive studies of the electrical power needs of the Inland Empire and making preparations for accelerating the $1,600,000 construction program for improvements and additions to its widespread system, Kinsey M. Robinson, president of the electric service company, said recently, folowing his talk before the Spokane County Bar Association.

Robinson, discussing the power situation in the Northwest, pointed out how the war situation has materially stepped up Spokane's opportunity for securing more industrial development, due to the need for airplane bases, training schools and other projects, and added, "if we are alert and push ahead, we can get federal projects, or projects that are encouraged by the government in connection with a national defense and preparedness program.

"The strategic position of the Inland Empire, in the event of the necessity for adequate defense is of the utmost importance," said Robinson. "An attack along our borders from Alaska to the Columbia river would place the coast line generally and the Puget Sound area in particular in the zone of operations. In such an event, the Inland Empire region, lying back of the Cascade mountains, becomes of prime importance as a zone of supply, with Spokane as a great distributing center. The value of dependable sources of supply of electrical energy, scattered but integrated, over networks of transmission and distribution lines that crisscross the area, therefore, cannot be overestimated.

"This region now produces ⅓ of the nation's lead; ¼ of the nation's silver; 12 per cent of the nation's zinc and ⅛ of the nation's gold production and ⅓ of the magnesite and lumber. To maintain and accelerate these productions the Washington Water Power Co. is equipped to supply whatever electric power is necessary. Through its present stations and its interconnections with other companies, the company has immediately available power supplies far in excess of present loads. It can provide a large amount of additional power for the entire area by inter-connecting with the Bonneville-Grand Coulee transmission line in the Yakima Pasco area."

★ Robinson has been one of the strongest proponents of a policy of cooperation between Federal projects and private utilities. His efforts are bearing fruit—witness the new WWP-Bonneville interconnection.

● A DECISION in favor of PUD No. 2, Grant County and PUD No. 1, Douglas County, Wash., has been rendered by Judge E. W. Schwellenbach in suits against the Washington Water Power Co. The court ruled that the public utility districts in both counties specified and adopted a sufficient plan under the statute, and ruled that the petitioners were entitled to an order of public use and necessity. The question of taking in territory in adjacent counties, which had been held illegal, in other counties, was not raised in the Grant and Douglas county cases.

Puget Sound Declares New Residential Rates

The Puget Sound Power & Light Co., Seattle, has declared new residential rate reductions for electric current, effective on meter readings after July 15. They have been approved by the Department of Public Service. The new rates will be effective in the Seattle metropolitan area, including Renton, and will save customers $115,000 annually, according to Don G. Abel, director of the department. On the same date, a downward rate revision announced in May by City Light will become effective.

The power company's new schedule cuts present charges of 4½c per kw.-hr. for the first forty kw.-hr. of consumption per month to 3½c per kw.-hr. for the first fifty kw.-hr. Corresponding reductions for larger amounts of current used are announced.

President Frank McLaughlin of the power company stated that his company's new rates match those announced by the City plant. Last previous reductions were made Sept. 1, 1939, by both companies. City Light said its new cut would save users $200,000 annually.

City officials declare that after careful investigation, they find that the new "all-electric" residence rate will be the cheapest in the country, with the exception of Tacoma, Wash.

According to reports by City Light Department officials, Seattle's new electrical rate cuts increased electrical sales and equipment installation for the month of June beyond all expectations. Superintendent E. R. Hoffman states that "June orders for automatic electric water heaters, not affected by the record-low all-electric rate, have increased sales between 300 and 400 per cent."

★ Many utility people are speculating upon the ultimate outcome of the rate contest apparently underway in the Pacific Northwest. Bonneville started it with Forest Grove. Now almost all utilities—private and municipal—are vieing for the spotlight.

Grays Harbor Customers To Save $150,000 Annually

Grays Harbor PUD No. 1, Aberdeen, now has a new rate schedule which is cutting residential and commercial electric costs by 22 per cent, industrial rates by 11 per cent and costs to cities, churches and schools by 25 per cent. Robert W. Beck, PUD manager estimates the new rates will save consumers about $150,000 a year. The new rates will be the lowest in Washington for cities of its population (10,000 to 50,000) Beck declares. Rural and urban charges will be identical throughout the district.

At the same time, Beck recommended wage increases for PUD employees totaling $18,552, also to take effect July 1. Under the new rates, 100 kw. of electricity will cost homeowners $3.30, compared with $4.90 for the same amount under present rates; for 240 kw.-hr. the monthly bill, under the new rates, would be $5.40, compared with a former $7.30, a reduction of 30 per cent. A new optional rate of $4.80 per month for those who use up to 240 kw.-hr. plus ¾c per kw.-hr. over that, is an alternative available to residential customers. A new flat rate to non-utility municipalities, churches and schools of 2¾c is announced.

Utah Power Cuts

A new, low and simplified rate schedule, making still cheaper the cost of electric service to Evanston (Wyoming) residential and commercial lighting customers, was put into effect by the Utah Power & Light Co., July 1. According to I. R. Woolley, manager of the Evanston division, the reduction will result in an annual consumer saving of approximately $2600.

The new schedule available to residential and farm users brings rates substantially under the national average and approximately 60 per cent below the 12-cent per kw.-hr. rate in effect in the locality in 1925.

The objective rate and half-price plan having built up use to an average warranting a lower schedule is now replaced by one low, simple residential rate. The new monthly net rate is:

One dollar (minimum charge) includes 11 kw.-hr.; 5 cents per kw.-hr. for 25 kw.-hr.; 2.5 cents per kw.-hr. for 164 kw.-hr.; 1.5 cents per kw.-hr. for all over 200 kw.-hr.

● THE OKANOGAN COUNTY Electric Cooperative, Winthrop, Wash., has purchased the properties of the Upper Methow Valley Light Co. for $27.000. The property acquired consists of a turbine-driven generator and lines serving the town of Winthrop and farm homes for several miles in the vicinity.

Northport (Wash.) Power Application with FPC

The Northport Power and Light Co., a corporation of the State of Washington, with principal office at Northport, Wash., selling electric energy in the town of Northport and vicinity, has filed with the Federal Power Commission its application for a Presidential Permit for the operation, maintenance and connection at the border of the United States and Canada of facilities for the transmission of electric energy imported from Canada.

The applicant stated it has a contract with its parent company, the West Kootenay Power and Light Co., Ltd., of the Province of British Columbia, for the purchase of the electric energy imported. A foreign branch of Northport Power and Light Co. of the same name, operating in Trail, British Columbia, has been granted a Canadian license to permit sale of energy for export at or near Silica, Cascade, and Carson, British Columbia. Energy reaching the United States is delivered to the Northport Power and Light Co. through its substation at Northport in Washington.

Portable Electric Screen Stopping Hoppers

A portable high voltage electric screen has been bringing sudden death to thousands of hungry grasshoppers in the Kern County, Calif. area. S. Fingerhut, Bakersfield electric shop proprietor, constructed the device to aid local farmers in their fight against a grasshopper invasion.

Approximately 3,000 ft. of wire was rigged across a large rectangular frame attached to a truck. A generator and a step-up coil mounted on the truck bed pours 8,500 to 12,000 volts through the wire rigging as the truck is driven through rows of plants. The hoppers fly into the air in front of the device and are grilled on the electric wires.

● IN THE CONSTRUCTION of the new Shasta Dam, the Bureau of Reclamation will use a sequence of motor-driven conveyor belts 10 miles long—the longest system in the world. Because of the immense amount of gravel, sand and concrete needed for this work, it was decided to use a conveyor system, electrically equipped by General Electric, instead of trucks or a railroad. Power will be supplied by twenty-five 200-hp., 1,800 rpm., 4,000-volt wound-rotor induction motors, and one 75-hp., 1,800 rpm., 4,000-volt motor. Control for the system will consist of 26 non-reversing, magnetic-control panels and five thrustor brakes, and accessories.

● BEARING 101,407 signatures, more than double the legal requirement of 50,000, Initiative 139, which proposes to amend the present Public Utilities District law in the State of Washington, has been filed with Secretary of State Belle Reeves in Olympia. Initiative 139 provides that all bonding proposals for PUD projects should be put up to the people of each district for decision before such public debt is incurred. The proposal would cover either new construction or purchase of existing utilities.

Grand Coulee Dam At Highest Elevation

With the pouring of one of the topmost blocks, in the east abutment section, part of Grand Coulee Dam reached its highest elevation, 550 feet above lowest bedrock last month.

Other such blocks, fifty feet long and thirty feet wide, will follow rapidly, until by September, both ends of the dam will have been completed. The more difficult work in the center spillway section will have been completed by next year, when motorists will be able to drive three-quarters of a mile along the 35-foot wide highway at the top of the dam. The block which was just completed is part of that roadway.

Myers To Proceed With PUD Purchase

Guy C. Myers of New York, fiscal agent for the Cowlitz County Public Utility District No. 1 at Longview, Wash., has been instructed to proceed with negotiations for the purchase of Washington Gas & Electric Co.'s holdings in Cowlitz County.

The 42-day appeal period in the condemnation action of the Cowlitz County PUD against the Washington Gas & Electric Co. has expired, and expiration of the appeal closes any avenue for further court consideration of the case. The Federal Jury of Tacoma recently set the purchase valuation on the utility property at $6,011,566.

● THE FEDERAL POWER COMMISSION has ordered a major license to be issued to the Montana Power Co. of Butte, for operation of a power dam across Flint Creek in Deer Lodge and Granite Counties, Mont., within the Deer Lodge National Forest. The dam was built by the Anaconda Copper Mining Co. partly under a permit granted by the Secretary of Agriculture and partly under a minor part license by the commission in 1926. The development was acquired by the power company in 1937 and applications filed that year for a commission license.

FPC Issues Statistics Report For 1939

The Federal Power Commission issued last month a report entitled "Electric Power Statistics—1939." This six-part publication contains:

(1) Production of electric energy in the United States,
(2) Installed capacity of generating plants,
(3) Scheduled additions to generating capacity,
(4) Consumption of fuel by electric generating plants,
(5) Movement of electric energy across State lines and international boundaries,
(6) Per capita statistics relating to the production of electric energy and the capacity of electric generating plants.

A supplement to the report, containing detailed tables for each month of 1939 showing the production of electric energy by class of ownership, type of prime mover, and by States, together with monthly fuel consumption figures, is in process of publication and will be issued soon.

Copies of the supplement and of the 61-page report issued today may be obtained from the Federal Power Commission, Washington, D. C., at 25 cents each, remittance to accompany order. Price for report and supplement—two volumes—50 cents. Stamps are not acceptable. For convenience in ordering, the report issued today may be referred to as "FPC S-4." The forthcoming supplement has been designated as "FPC S-7."

● THE 135 TWIN COACH trackless trolleys ordered by the Seattle Transportation Commission for Seattle's municipal transportation system will be equipped with Westinghouse motors of the series type, while the 100 cars ordered from the Pacific Car & Foundry Co., Seattle, will be equipped with General Electric compound-type motors.

● W. R. MARSHALL, who recently resigned as vice-president of the Westinghouse Electric & Manufacturing Co., has announced the formation of the firm of Marshall, Sanders, Inc., investment securities, with headquarters at 406 Montgomery St., San Francisco. The firm, which Marshall heads as president, will act as Pacific Coast distributors for the periodic investment plans sponsored by the F.I.F. Plan Corp. of New York. Prior to his resignation Marshall had been with Westinghouse for 33 years, the last ten of which he served as vice-president in charge of Pacific Coast operations.

Seattle City Light Statistics Reported

Seattle City Light customers, during the year ending May 31, used 35,000,000 more kw.-hr. of electrical energy than they did during the preceding year, Superintendent E. R. Hoffman reports. A total use of more than 387,000,000 kw.-hr. is recorded. There were 101,743 meters on City Light lines during the fiscal year, an increase of 2,785; revenues totaled $6,136,902.71, an increase of $129,075; merchandise sales totaled $545,516.68, an increase of $39,419.57. The 38,448 electric ranges in use struck an all-time high, and exceeded the previous year by 3,102.

City Light had retired $28,738,000 worth of bonds as of May 31, $20,838,000 worth of them out of earnings, and $7,900,000 by refunding bonds bearing a lower rate of interest. This leaves outstanding only $38,155,000.

Wash. Tax Commission Figures on Increase

Figures supplied by the State Tax Commission, Olympia, Wash., show an increase of $9,500,826 over 1939 values for tentative assessed valuations on all utilities in the state operating in more than one county. Puget Sound Power & Light Co., with 100% total assessed valuation, showed an increase of $3,550,000; Washington Water Power Co., $30,500,000, increase of $2,420,000; Inland Power & Light Co., $5,740,000, no change; Northwestern Electric Co., $1,894,000, drop of $14,390; Pacific Power & Light Co., $929,000, rise of $14,620; Washington Gas & Electric Co., $4,250,000, rise of $290,000.

Wash. Water Power to Spend $305,000

Plans for 1940 and 1941 for the Washington Water Power Co. include the spending of $350,000 on the realignment of its main transmission service from the west into the city of Spokane, according to Kinsey M. Robinson, president.

This expenditure will cover the building of the new Sunset substation, now under way, and the new 110,000-volt power line now being built around the city from the East side substation at the Spokane River and Havana to the Sunset substation. The poles have been erected for this line and wires are being strung.

● The Kittitas County (Ellensburg, Wash.) rural electric line will be extended in five different districts, at a cost of about $5,000. R. C. Sherman, Ellensburg, superintendent. Bennett & Taylor, Los Angeles, hold the contract for the 127-mile original line, at $95,970.

● Under progress schedules announced by the U. S. Bureau of Reclamation first power from Grand Coulee will be available some time in October when the two 12,500 kva. house generators begin operating. The first of the 108,500-kva. main generators is scheduled for operation in July, 1941, with the second and third units set for October, 1941 and March, 1942. These dates are six months earlier than originally anticipated.

● Fritz Ziebarth Construction Co., Long Beach, Calif., who has handled a number of REA contracts in the Northwest, has revealed plans for the construction of the concern's Northwest headquarters in Vancouver, Wash. The building will be a warehouse type structure, of concrete construction.

● The Tacoma, Wash., Board of Contracts and Awards has awarded to the Bethlehem Steel Co., on a bid of $19,624, contract for two 190-foot Hylebos waterway crossing towers and five 88-foot line towers for the Tacoma intertie with Bonneville power.

A DEMONSTRATION AND DISPLAY unit of the A. B. Chance Co. has been touring the Western States. Designed for use in making hot line tool demonstrations, this Oldsmobile Custom Coupe has been on display at various power companies the last month in charge of O. G. Andersen

REA Declares $100,000,000 Funds Ready for Project

REA is shaping plans for the early construction of $100,000,000 of new rural power lines to serve some 300,000 farm families and other rural users, Administrator Harry Slattery declared last month.

During June REA conducted a series of statewide meetings of leaders in the rural electrification movement to determine where applications for loans are under development and what progress has been made. This has enabled REA to make a tentative distribution of the $100,000,000 by States.

Because many applications have been pending a long time and are urgent, REA will allot immediately a substantial part of the loan funds available for the entire year. Plans take into account the capacity of construction contractors to build lines and of material suppliers to provide poles, transformers, wire, hardware, and other power system components. Some of the funds will be reserved for later allotment.

The increase in loan funds from the $40,000,000 contemplated in the original plans to $100,000,000 will enable REA to take care of the backlog of applications totaling more than $70,000,000 which have already been submitted to Washington, or are under local development. These applications continued to pile up after loan funds for the 1939-40 fiscal year became exhausted during the winter.

Schedule of Allotments

Arizona	$ 300,000
California	360,000
Colorado	2,150,000
Idaho	300,000
Montana	1,000,000
Nevada	35,000
New Mexico	375,000
Oregon	2,100,000
Utah	150,000
Washington	1,801,700
Wyoming	630,000

● The Inland Empire Rural Electrification, Inc., Spokane, has a survey under way providing for expenditure of $500,000 for construction of about 500 miles of lines as extensions to the present systems in Spokane, Whitman and Garfield Counties. These extensions, it is estimated, will bring electric service to 1,000 to 1,500 farmers. The Inland Empire project has already expended more than $1,500,000 with 1,200 miles of system, serving 2,300 customers. Proposed extensions will make it one of the largest cooperative projects of its kind in the country.

● The Skamania County Public Utility District, Stevenson, Wash., will spend $42,791 on new construction and replacements throughout the district, including a new transmission line.

REA Activities

San Isabel Electric Assn., Inc., Pueblo, Colo., has been awarded $108,000 for 104 miles of line in Custer, Pueblo and Fremont Counties.

LaPlata Electric Assn., Inc., Durango, Colo., has been allotted $155,000 for 180 mi. of line in LaPlata and Archuleta Counties.

Lost River Electric Cooperative, Inc., Moore, Idaho, has been awarded $79,000 for 79 mi. of line, and $3,000 for wiring.

Beartooth Electric Coop., Inc., Absarokee, Mont., has been awarded $284,000 for 269 mi. of line, and $10,000 for wiring.

Benton Rural Electric Assn., Prosser, Wash., has been awarded $82,000 to build 89 mi. of line in Yakima County.

Public Utility Dist. No. 1 of Klickitat County, Centerville, Wash., has been allotted $100,000 to build 77 mi. of line.

Columbia County Rural Electric Assn., Dayton, Wash., has been awarded $55,000 to build 52 mi. of line in Cowlitz County.

Douglas County Electric Coop., Inc., Waterville, Wash., has been awarded $72,000 to build 94 mi. of line in Douglas County, and $3,000 for wiring.

McKenzie River Electric Coop., Inc., Eugene, Ore., has been awarded $53,000 to build 34 mi. of line in Lane County, and $2,000 for wiring.

Central Electric Coop., Inc., Redmond, Ore., has been awarded $244,000 to build 245 mi. of line in Deschutes, Crook and Jefferson Counties, and the town of Sisters.

Lincoln Electric Coop., Inc., Davenport, Wash., has been awarded $438,000 to build 592 mi. of line in Lincoln and Grant Counties.

Empire Electric Assn., Inc., Dove Creek, Colo., has been awarded $87,000 to build 73 mi. of line in Dolores and Montezuma Counties.

Benton-Lincoln Electric Coop., Inc., Corvallis, Ore., has been awarded $25,000 to build 20 mi. of line.

Contracts Awarded

● Under a contract awarded to the Washington Water Power Co., the company will furnish heat for the city of Spokane's city hall for the coming year at a cost of 70c per 1,000 lb. of steam, or a maximum charge of $6,500.

To Homer G. Johnson, Portland, Ore., for building 84 miles of line for the Coos Electric Cooperative, Coquille, Ore., $72,866.

To Electric Smith, Spokane, Wash., for building 62.8 miles of line for The Northern Idaho Rural Electrical Rehabilitation Assn., Sandpoint, Idaho, $49,060.

To Midland Construction Co. for building another section of the system of the Idaho County Light & Power Cooperative Assn., Inc., Grangeville, Idaho, $81,892.

To Oberg Electric Co., Salt Lake City, for installing and furnishing electrical fixtures and floodlighting equipment for the new City and County building at Ogden, Utah, $19,995.

To The City Electric & Fixture Co., Seattle, by the Bureau of Yards & Docks, Navy department, for extending the fire protection system at the Keyport naval torpedo station, near Bremerton, Wash. Project calls for improvements to the electrical distribution and fire alarm system, as well as for additional facilities for fire protection, $71,958.

Moved

Anaconda Wire and Cable Co. office in Seattle changed from 914 First Ave. South to 1420 Exchange Building.

Dan Searle Electric Co., Monterey, moved from 580 Main St. to 340 Tyler St.

Don G. Guivney, Auto Electric Sales Co. of Denver, moved from 1448 Madison St. to 1711 East Fifth Ave.

S. G. Hepler, Arrow Electric Co., Seattle, moved from 710 Harrison St. to 2021 Third St.

Tom Lawson Electric Co., Glendale, moved from 2229½ North Brand Blvd. to 215 South Brand.

TRADE NOTES

● Horton Mfg. Co., makers of washers and ironers in Fort Wayne, Ind., have opened a show room and office at the Western Furniture Exchange in San Francisco, according to A. B. Pursley, district manager.

● C. V. Stewart has been appointed Northern California and Nevada representative of Hygrade Sylvania Corp. of Salem, Mass. He has offices at 210 Post St., San Francisco, and is specializing in that company's fluorescent equipment.

● The Winters Mfg. and Distributing Co., Salt Lake City, have been appointed authorized Intermountain distributors of Westinghouse air-conditioning and commercial refrigeration equipment. General manager of the new organization is Elwood G. Winters.

● The Laguna Beach Appliance Co., Laguna Beach, Calif., recently enlarged its store to include two rooms upstairs which are being used for appliance demonstrations and displays. Lloyd Loveland is sales manager for the company, which recently was made a retail outlet for Bendix washers.

● Robert Willoughby, Builders' Supply, Clarkston, Wash., is remodeling his business house to include a model kitchen and display windows for his electrical equipment. Willoughby is adding the complete Hotpoint line. Warren Smith, Dodge Garage, plans to handle the General Electric line.

● Marin Electric Co. of Mill Valley is building a new and larger store in the shopping district just east of the older part of town.

● Albert Kessler & Company, Ltd., has opened offices and showrooms on the 5th floor of the Western Merchandise Mart, San Francisco. This long-established firm is one of the largest gift and housewares wholesalers on the Coast. Formal opening of the new showroom was held on the opening day of the San Francisco Market Week, July 29.

● Edward Hersovitz, manager of the appliance department of the Reliable Furniture Co., Ogden, Utah, a member of the Westinghouse Quota-Busting club, as the first salesman in the Intermountain area to reach his quota this year.

● McDonald Electric Ltd., Victoria, have been appointed distributors for General Electric refrigerators. They already handle all other General Electric appliances on a retail basis. The firm is now entering its tenth year of business operations in Victoria.

ABOUT PEOPLE

Scattergood Retires From Los Angeles Bureau P & L

E. F. Scattergood, general manager and chief electrical engineer of the Los Angeles Municipal Bureau of Power and Light since its inception, was retired July 9. H. C. Gardett, assistant chief electrical engineer, was appointed

SCATTERGOOD

as his successor. Roy Martindale, operating engineer, stepped up to fill the position vacated by Gardett.

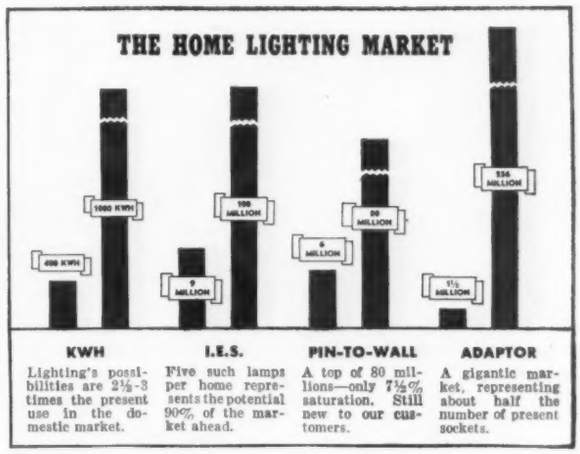
"Market saturated? Don't ever think it!" says General Electric

WE HAVE NOT YET BEGUN TO LIGHT

LAST year surveys were made by 39 utilities—in towns large and small—covering all income groups. General Electric's analysis of these surveys covering 54,908 rooms in 9,379 homes reveals amazing facts regarding the vast untapped home lighting market.

61% OF HOMES HAD EMPTY SOCKETS. Roughly 3 out of 5 homes had one or more empty sockets. Only 2 homes out of 5 had spare bulbs on hand.

9.3% OF SOCKETS WERE EMPTY. If all these sockets could be fitted with 60-watt bulbs, at 200 hours per year and at a 3½c rate, the revenue increase would be $3.96 per home. To say nothing of the plus income if some of those sockets were filled with 150 watt bulbs!


THE HOME LIGHTING MARKET
400 KWH
1000 KWH
9 MILLION
100 MILLION
6 MILLION
80 MILLION
9½ MILLION
936 MILLION
KWH
Lighting's possibilities are 2½-3 times the present use in the domestic market.
I.E.S.
Five such lamps per home represents the potential 90% of the market ahead.
PIN-TO-WALL
A top of 80 millions—only 7½% saturation. Still new to our customers.
ADAPTOR
A gigantic market, representing about half the number of present sockets.

G.E. AIMS AT MASS EDUCATION WITH MAGAZINE AND RADIO ADVERTISING!

To help fill these empty sockets and to sell more lamps and adaptors, General Electric not only is maintaining its large volume of advertising—now twenty-four messages per home per year—but has tripled the readership-per-advertisement.

Radio, too, is telling the story week after week, all year long, to an ever increasing audience through the G-E MAZDA Lamp "Hour of Charm" radio program. Listeners are now at an all-time high—4,000,000 a week!

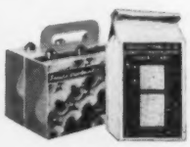
WRITE FOR THESE NEW PROFIT AIDS TODAY!

HERE ARE only two of the excellent booklets just hot off the press, designed to build better appreciation of home lighting needs.

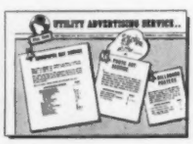
HOW TO STEP-UP HOME LIGHTING

A complete array of brand new literature is ready for you to use—in bright new dress—full of basic lighting information—carrying a powerful sales appeal. Guides for utilities, dealers, and wholesalers—booklets, bill inserts designed for mass market appeal—new displays and other advertising helps.

TWO FLASHY NEW newspaper tabloid size handbills, featuring price reductions on MAZDA lamps, and new equipment for the mass market.



CLEVERLY DESIGNED new Lamp Carton. And a unique shopping bag with Right-Size-Bulb Chart for easy reference.



UTILITIES Advertising Service, with a wealth of new newspaper mats, photo art service, billboard posters, and displays.

COMMERCIAL AND INDUSTRIAL SELLING HELPS

A load of new material on commercial and industrial lighting. Booklets, folders on every phase of this profitable market—new mailing pieces on fluorescent lighting—a gold mine of sales-producing literature.

EDUCATIONAL MATERIAL. A new and comprehensive sight-saving project for schools. Other booklets on the science of seeing, valuable for use with home service groups, consumer education groups, school classes.

READY FOR YOUR FALL LIGHTING ACTIVITY. The use of lighting in America has been increasing steadily. Since 1933, lighting, measured in bulbs, has outdistanced meter growth by 57% to 19%. While meter installations are approaching saturation lighting is less than 10% saturated.

G-E MAZDA LAMPS

GENERAL ELECTRIC

General Electric Co., Dept. 166-EW-H, Nela Park, Cleveland, Ohio.

Please send me your new booklet "Lead with Light in the 40's".

Name .....

Company .....

Address .....

The Los Angeles Board of Water and Power Commissioners retired Mr. Scattergood at his own request and retained him in an advisory capacity for the next five years at his present salary of $24,000, after which he will receive half the sum as annual compensation for life.

Before coming to Los Angeles, Mr. Scattergood was a member of the faculty of Georgia Tech. Both he and Mr. Gardett began working for the City of Los Angeles in 1906 in power development work along the line of the aqueduct. The Municipal Bureau of Power and Light was created about a decade later with Mr. Scattergood at its head. He is 69 years of age.

GARDETT

Portland General Electric Changes Three Men

L. C. White, F. G. Starrett and E. R. Fletcher of Portland General Electric recently figured in a three-way transfer of positions. Fletcher left his post in Salem, where he has been illuminating engineer for the past five years to become manager of the St. Helens division at St. Helens, Ore.

Starrett, whom Fletcher replaces, became Gresham division manager, replacing L. C. White, who is being transferred to the Portland office. According to Fred G. Hodge, general division manager, these moves were made because of White's health.

Utah Power & Light Names Bailey as Division Head

Recent changes in personnel of the Utah Power & Light Co. has placed Roscoe E. Bailey, manager of the company's Park City division for 14 years, in the position of manager of the southern division. He succeeds George L. Ellerbeck, recently placed in charge of the Ogden division.

Bailey is a veteran power company employe, having worked up through the ranks since he joined the company as power salesman in November, 1914. In December, 1915, he was promoted to superintendent of power sales and advanced to assistant to commercial manager in 1924.

A native of Illinois, he graduated from the state university engineering school and completed his education at the Central station institute of the Commonwealth-Edison company, Chicago. He began his electric utility career with the Illinois Northern Utilities Co. in 1914.

BAILEY

● WALTER R. JONES, industrial sales manager of Johns-Manville's Pacific Coast territory, died on July 16th at San Francisco after a short illness. Mr. Jones, who was 59 years old, was a life-long resident of San Francisco and had a very wide acquaintanceship among Pacific Coast industrial men. He served for 35 years with Johns-Manville as a salesman in the industrial materials department and was a member of the J-M Quarter Century Club, his company's honor society for employees with the organization for 25 years or longer.

● JAMES H. KING, general supt. of the Eastern Oregon Light & Power Co. and a resident of Baker, Ore. for 30 years, died July 5 at his home.

● WILLIAM P. SCOTT, 70, one of San Francisco's prominent electrical contractors, died July 20 following a heart attack. As president of the Scott Co., he carried out electrical contracts for the St. Francis Hotel, the Crocker Building and many other of the city's outstanding business establishments.

GEO. E. HONN CO.
420 Market St. San Francisco, Calif.
Manufacturers' Representative for
PYREX INSULATORS
S & C PROTECTIVE DEVICES
CORNELL-DUBILIER CAPACITORS
KELLEMS CABLE GRIPS
BLACKBURN CONNECTORS
COLUMBIA TONG TEST AMMETERS
—LOW VOLTAGE GENERATORS
BARTLETT TREE TRIMMING EQUIPMENT
METER JEWELS

Stocks at San Francisco
Electrical Specialty Co., Inc.,
316 Eleventh Street

Stocks at Los Angeles
Electrical Specialty Co. of So. Calif.,
451 South San Pedro Street

Stocks at Seattle
Electrical Specialty Co., Inc.,
714 Fourth Avenue

For the Coast Trade
At your doorstep you now have an adequate stock of popular D-H alloys, wires, ribbons, rods and other forms.
Driver-Harris Company
Harrison, N. J.

TRADE MARK REG. U.S. PAT. OFF.
Nichrome

Time Tested FUNDAMENTALS

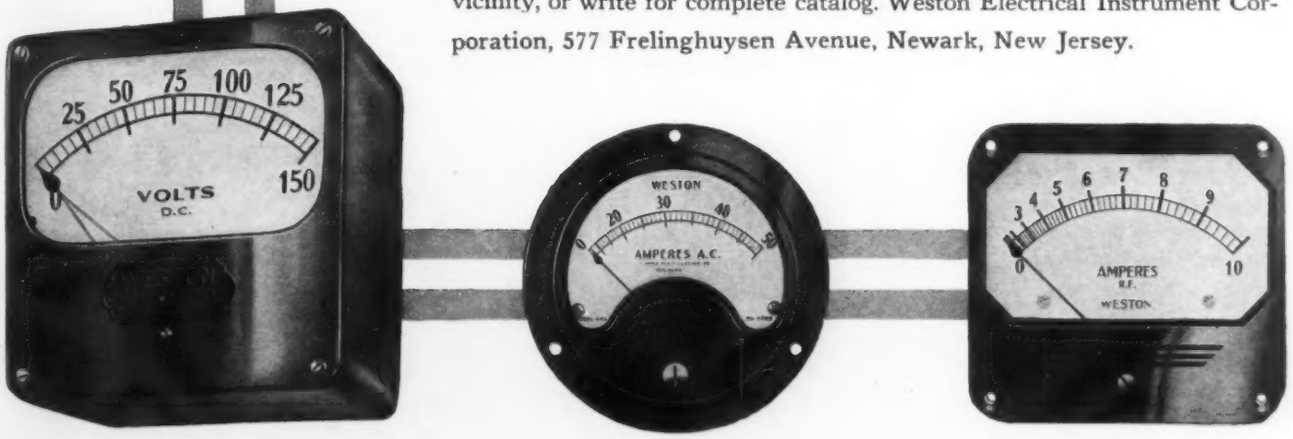
$I=\frac{E}{Z}$ $R=\frac{P}{I^2}$ $C=\frac{Q}{E}$ $P=EI$ $f=\frac{1}{T}$

$W=PT$ $f=\frac{1}{T}$ $I=\frac{E}{Z}$ $R=\frac{P}{I^2}$ $P=EI$

for Electrical Measurement

Like the fundamental laws of electricity itself, these basic types of WESTON instruments hold to the truth year after year. Their inherent accuracy rests on time-tested design principles; their reliability stems from a time-honored insistence on uncompromising standards of construction. At the same time, they are completely modern in the sense that they are keyed to today's needs . . . styled for today's preferences. » » » It's this clear combination of time-tested reliability and preference-tested modernity which keep WESTONS the preferred instruments for all switchboard, panel and built-in needs. They are selected not alone because they are modern instruments, but because they *stay* modern both in performance and in appearance.

Why not have complete information on the broad line of WESTON instruments at your fingertips? Communicate with the WESTON office in your vicinity, or write for complete catalog. Weston Electrical Instrument Corporation, 577 Frelinghuysen Avenue, Newark, New Jersey.



Laboratory Standards . . . Precision DC and AC Portables . . . Instrument Transformers . . . Sensitive Relays . . . DC, AC, and Thermo Switchboard and Panel Instruments.

WESTON

Specialized Test Equipment . . . Light Measurement and Control Devices . . . Exposure Meters . . . Aircraft Instruments . . . Electric Tachometers . . . Dial Thermometers.

FOR OVER 52 YEARS LEADERS IN ELECTRICAL MEASURING INSTRUMENTS

WESTERN REPRESENTATIVES

Seattle, Wash.
Eicher & Bratt,
263 Colman Bldg.

San Francisco, Calif.
Herman E. Held,
420 Market St.

Los Angeles, Calif.
A. A. Barbera,
Subway Terminal Bldg.

Denver, Colo.
J. W. Van De Grift,
623 Charles Bldg.

Phoenix, Ariz.
J. E. Redmond Co.,
448 W. Madison St.

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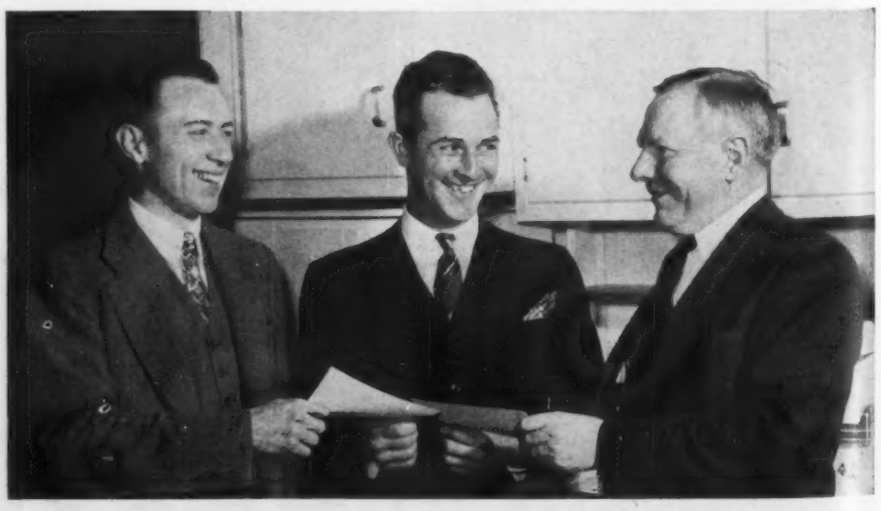
PROFILES OF THE MONTH

Busier than a bird-dog has been Don S. Campbell the past two years. He is engineer in charge of transmission design for Bonneville

Ralph J. Cordiner, president of Schick Dry Shaver, Inc., sets a fine example to his salesmen as he "Schick shaves" at his desk

Norge sales executives constantly ride the air highways. Here Howard E. Blood, president and general manager; Lee Cox, western sales manager; Peter Sues, Los Angeles Norge distributor, and William Lancaster, Leo J. Meyberg Co., San Francisco, ponder over a coming trip



Winner of the San Francisco district and Pacific Coast district range "Sam's Sales Auditions" prize was Al. W. Williford, Pacific Gas & Electric Co., San Jose. With the winner (center) are A. B. Murphy (left), sales development manager, Westinghouse, and W. I. Powell, Westinghouse

Preview of coming campaigns by P·G·and E·

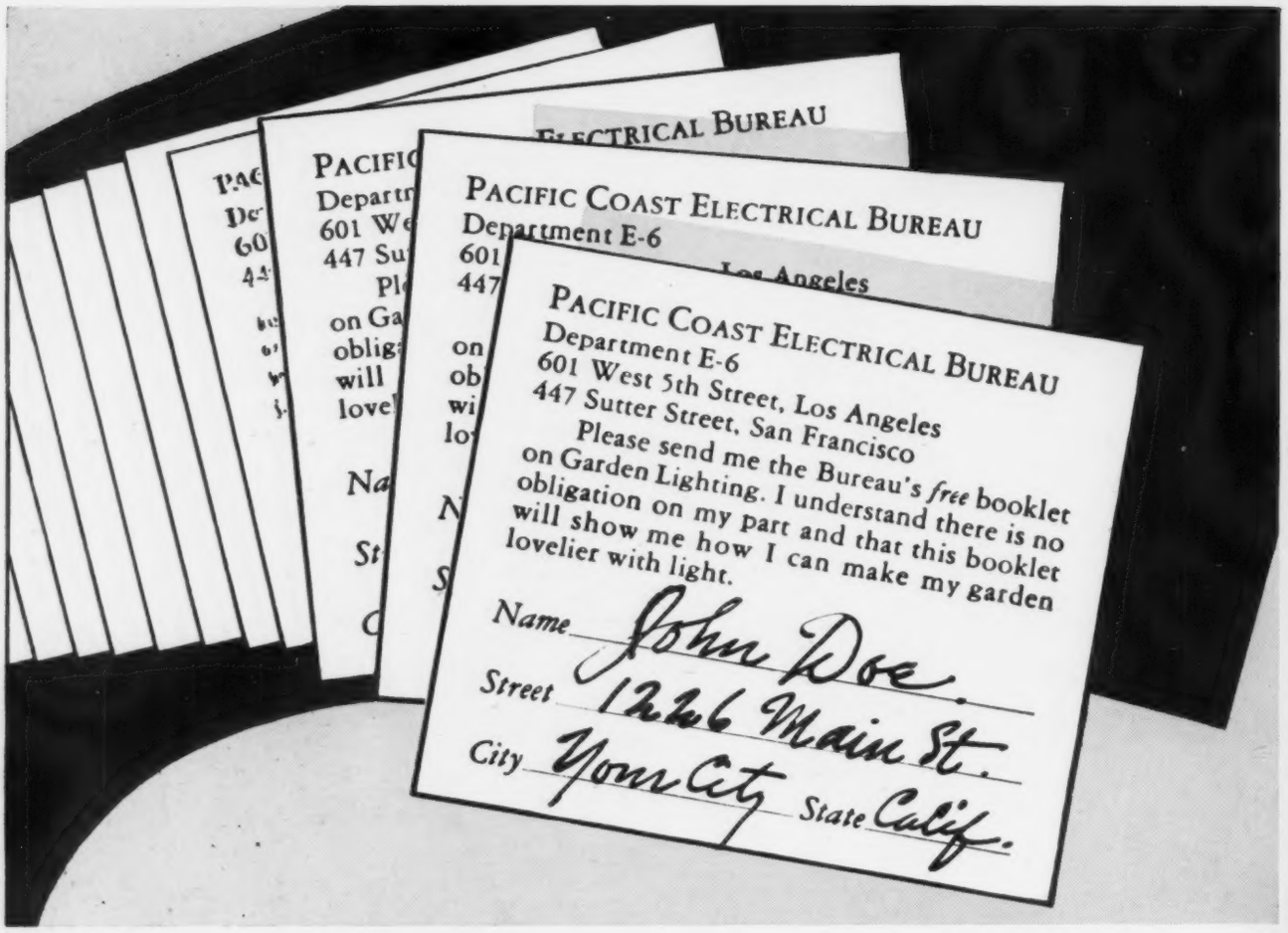
ELECTRIC APPLIANCE SOCIETY OF NORTHERN CALIFORNIA

Electric Range and Water Heater Promotion

Again this month, the Company's electric advertising will feature electric cooking and water heating! Copy will stress the automatic, time-saving features of electric ranges—their remarkable cleanliness—and the fact that electric kitchens are usually several degrees cooler than kitchens with ordinary stoves. A point will also be made of the low cost of electric cooking—and the low cost of the ranges themselves.

As outlined in our monthly dealer letter, the bulk of this promotion will be aimed at the valley and rural markets, but dealers throughout P.G. and E. electric territory are assured of at least one advertisement, plus a full schedule of poster advertising.

DEALERS: By watching this page from month to month you can keep informed of sales promotional campaigns to be sponsored by the Pacific Gas and Electric Company and the Electric Appliance Society. Detailed information will be supplied, as usual, through the mail. If such information is not received, call our local office or write Electric Appliance Society, 1355 Market St., San Francisco, Calif.


PACIFIC COAST ELECTRICAL BUREAU
Department E-6
601 West 5th Street, Los Angeles
447 Sutter Street, San Francisco
Please send me the Bureau's free booklet on Garden Lighting. I understand there is no obligation on my part and that this booklet will show me how I can make my garden lovelier with light.
Name John Doe.
Street 1226 Main St.
City Your City State Calif.

More than 8,000 booklets on domestic lighting and wiring alone have been requested through this Bureau already this year—an average of 1,000 a month. These requests are almost exclusively from homemakers in California.

Most of these thousands requesting wiring information are immediate prospects for wiring or rewiring. If they are prospects, it is for just one reason, and that is they want to buy and use more electrical appliances.

Adequate wiring promotion IS getting results, but it needs your cooperation if it is to be completely successful.

Even a line or two on your letterheads, billheads, and other stationery adds to the force of the adequate wiring story. Help make this truly the "electrical age." Advertise and publicize adequate wiring.

PACIFIC COAST ELECTRICAL BUREAU

601 WEST 5TH STREET LOS ANGELES • 447 SUTTER STREET SAN FRANCISCO

CERTIFIED ADEQUATE RED SEAL STANDARDS WIRING

8 40